

Western Industry

March 1955

*Western steel aids in creosote pressure
treating of wooden poles and railroad ties.
... see page 32*



DESIGN: Lubing problem

MAINTENANCE: Saving motors

Special section on

**Metals and
metalworking**

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here's the
FIRST
button
OF YOUR
PUSHBUTTON
PLANT...



Here's a button you can push today—right in your own office—to set into action a huge force of efficient operation. Yes, if you haven't already guessed, the button pictured above is a close-up view of a telephone pushbutton. That's all it takes—a single phone call *automatically* starts the entire Jorgensen plant working for you!

Jorgensen maintains a vast inventory of carbon, alloy, stainless, tool and specialty steels—as well as all types of aluminum. But when you order steel or aluminum, it isn't just a matter of transferring stock from a rack to a truck and delivering it to your door. Jorgensen maintains the staff and facilities to do a lot more than that. Experienced personnel supply the technical information you need and help you select the right material for the job. Then the Jorgensen crew works as a team to expedite your order—cutting material to exact size with painstaking accuracy, carefully checking chemical and physical requirements, and delivering it *when you want it*.

A whole organization is set in motion when you use that magic pushbutton. So when you need steel or aluminum—**CALL JORGENSEN FIRST!**

STEEL

Commercial & Aircraft
CARBON — ALLOY
STAINLESS — TOOL
Bars - Strip - Wire
Plates - Sheets - Coils
Structural - Billets
Open & Closed Die Forgings

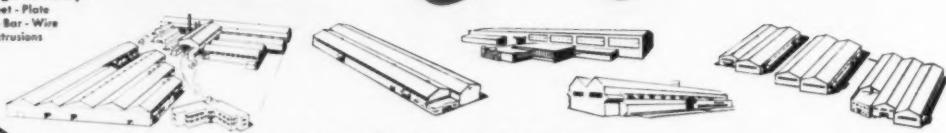
ALUMINUM

Full Range of Alloys
Sheet - Plate
Rod - Bar - Wire
Extrusions



CALL

Jorgensen
FIRST!



EARLE M. JORGENSEN CO.
STEEL



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Lorain 7-1122

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Higate 4-2030

TULSA
7311 East Pine St.
85-1511

DALLAS
2200 W. Commerce
Riverside 1761

HOUSTON
5311 Clinton Dr.
Orchard 1621

SAN FRANCISCO: Ask Operator for *Enterprise 10942* • **FORT WORTH:** Dial *FOrtune 0578*



Southern Oxygen Company portable Oxygen Tent with circulating and cooling system is the result of 30 years of experience.

only the very finest equipment can meet the challenge . . .

Some thirty years ago, SOUTHERN OXYGEN COMPANY with plants located in Maryland, Tennessee, North Carolina and New Jersey, perfected the first portable oxygen tent with circulating and cooling system to operate in any climate and to give the patient maximum comfort with dependable safety. Naturally, this experienced manufacturer of gases and of medical equipment carefully tested all types of pressure regulators . . . and it selected the two-stage reduction regulators made by NATIONAL of California because they proved easier to operate, less subject to refrigeration effects, more able to hold the required oxygen pressure adjustment and of longer service life. When oxygen regulators are employed in the crucial tasks of saving lives and ministering to the comfort of the sick, only the very finest equipment merits selection. These same lasting qualities and operating advantages will be yours when you too select these regulator makes for your industrial needs.

we cordially invite you to write today—for free copy of a beautifully illustrated, 44 page, regulator brochure.

NATIONAL welding equipment company... 218 fremont street san francisco 5 california

when life hangs in the balance



. . . and, because only the finest regulator assures maximum safety and dependability, NATIONAL of California regulators are chosen.

544 DEPT. 140



March 1955

Vol. XX, No. 3

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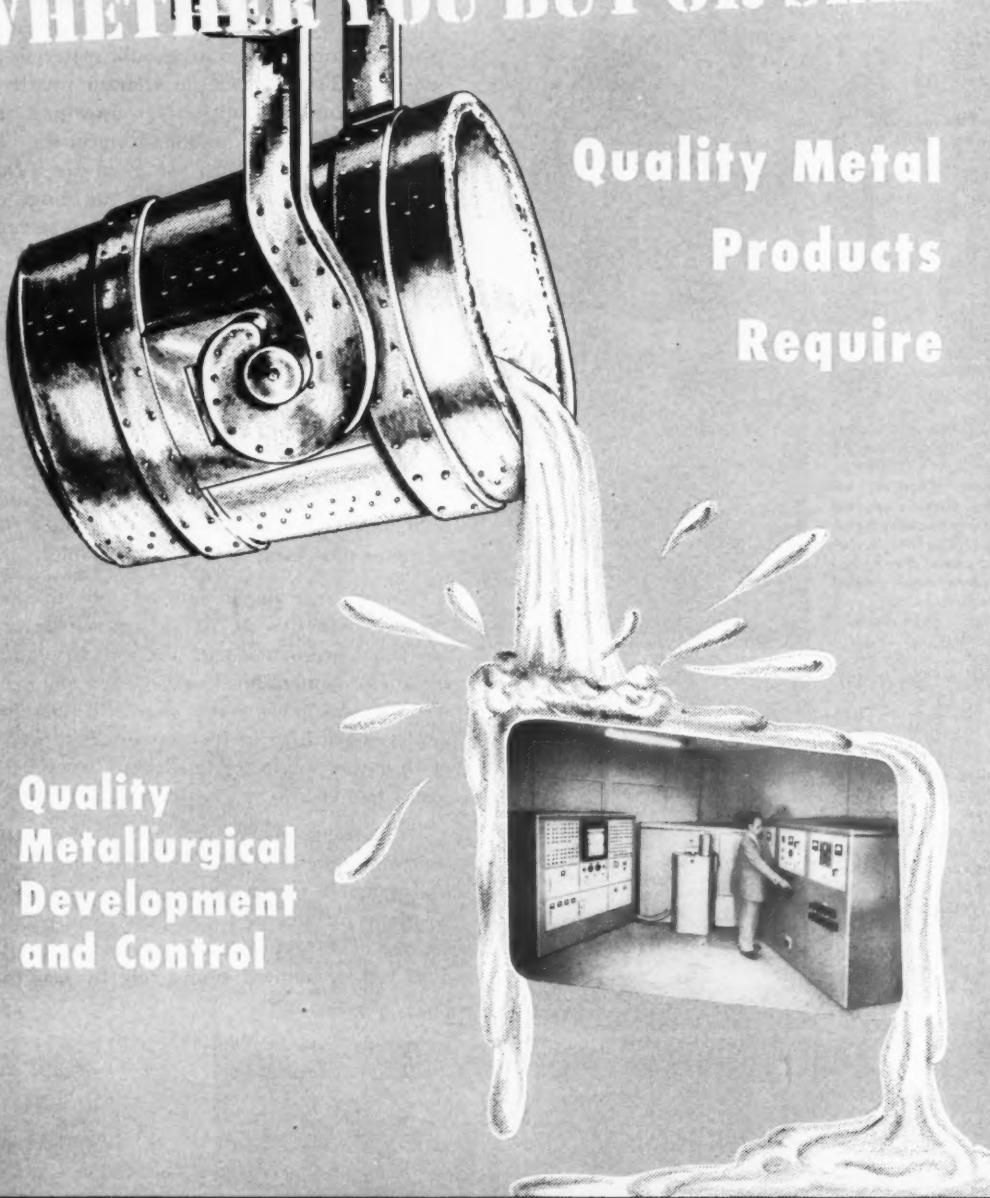
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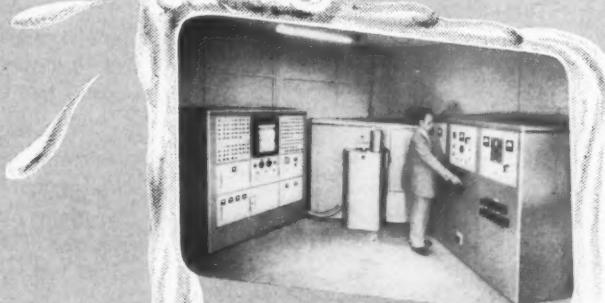
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WHETHER YOU BUY OR SELL



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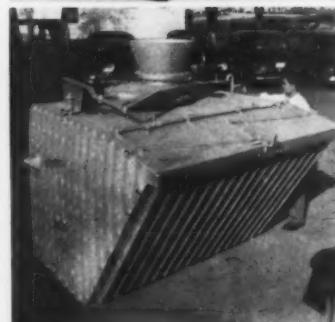
PRICE
LIST ON
REQUEST

Briefly, this ad illustrates why DEMPSTER-DUMPSTER SYSTEM

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.



This Tilt Type Container was the result of a cost-cutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling fins, counterbalanced hinged lid with 3-way locking device, 16" sliding gate valve and two sight-glass inspection openings.



Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where the Dempster-Dumpster System was applied to an additional problem to further reduce costs.



Container at right is just one of several different types we have designed to handle equipment, materials, packages, parcels, etc.



IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower cost.

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers, Inc.



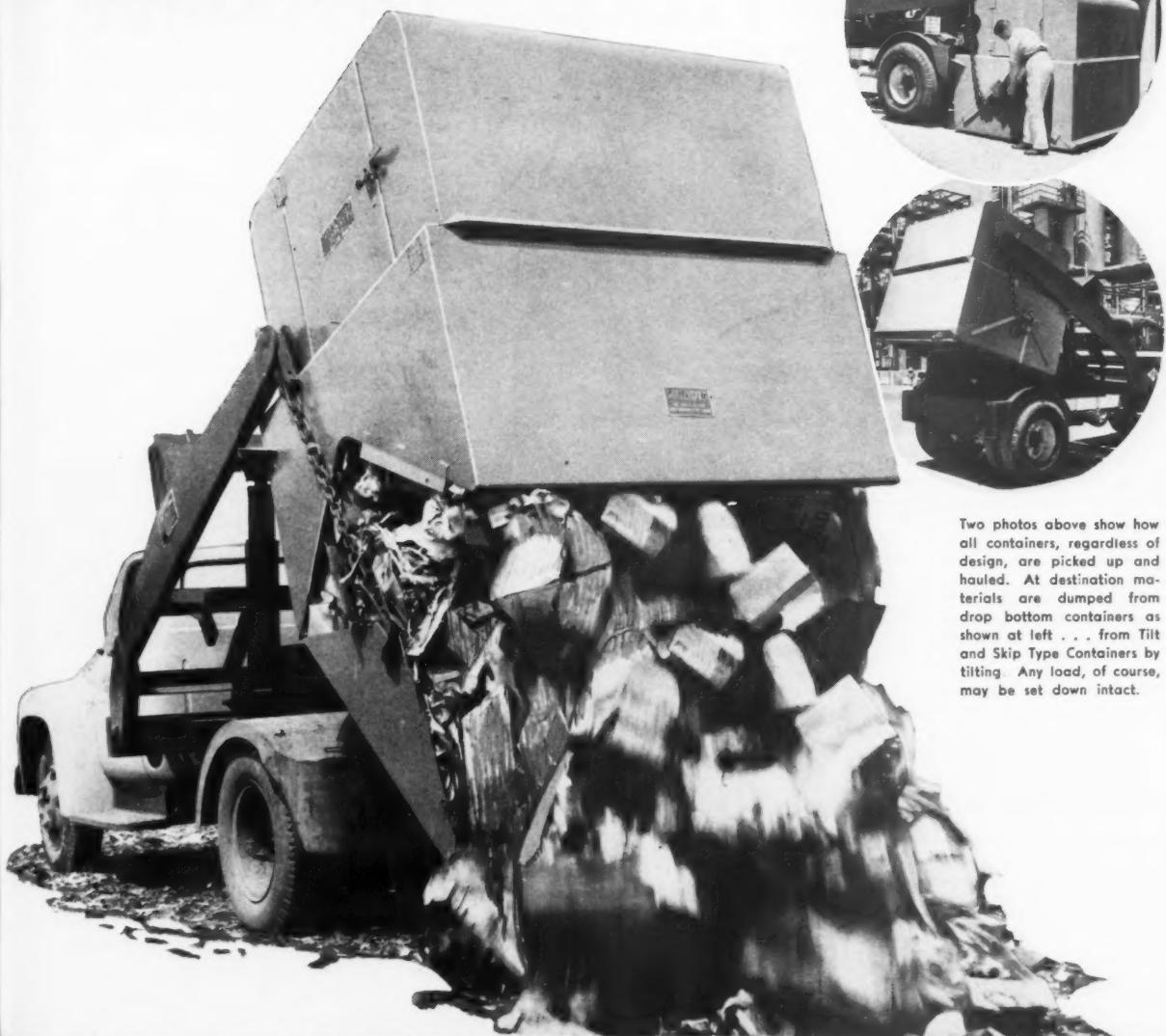
Above container is built with cast iron liner. The holes in outer wall are for cooling.



Here is one of several special drop bottom type containers equipped with couplers and ball bearing trucks for operation in train on rails.

DEMPSTER BROTHERS

so many plants find the indispensable...



Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.



This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be decanted before sludge is transported and dumped at waste basin.



Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.

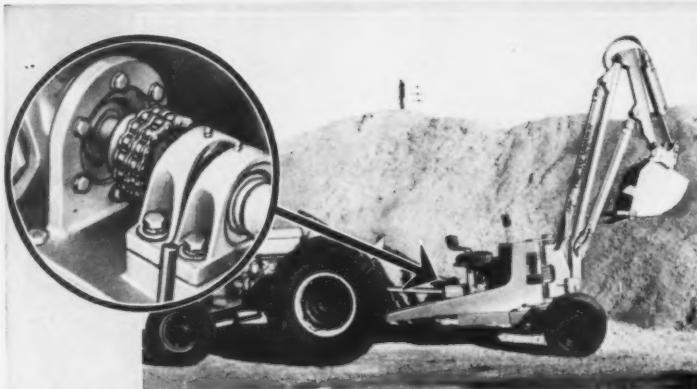


This is a master container with three 2 cu. yd. insert containers. Each insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

RS

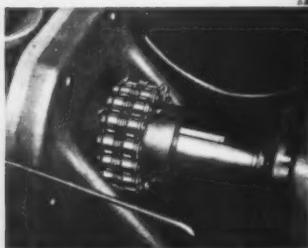
535 N. Knox, Knoxville 17, Tennessee

SOLVE YOUR SHAFT CONNECTION PROBLEMS WITH DIAMOND FLEXIBLE COUPLINGS!



MACHINE TOOL APPLICATION

This modern multiple wheel hydraulic grinding machine uses a compact Diamond Flexible Coupling between motor and hydraulic pump.



DIRECT DRIVE TO GENERATOR

Ability of Diamond Couplings to absorb end-play and slight misalignment makes unit assembly less costly, cuts down time-wasting shim installations.



Bulletin No. 19 contains complete data for the selection of Diamond Flexible Couplings from fractional to over 600 horsepower. Your copy will be sent upon request.



DIAMOND

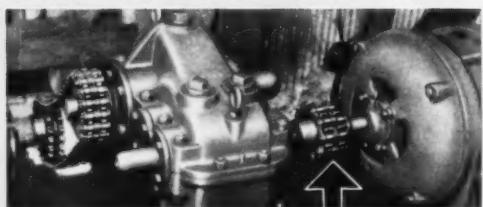
POWER TAKE-OFF

Diamond Flexible Coupling connects drive shaft from tractor to hydraulic pump on trailer type back-hoe.

HYDRAULIC
PUMP
DRIVE



Diamond Coupling provides quick, easy installation. Driving and driven shafts need not be of the same diameter.



ELECTRIC MOTOR TO SPEED REDUCER

High speed shaft connections require little space with compact Diamond Couplings. Installation is quick and easy.

Diamond Couplings Absorb Shaft End-Play and Moderate Misalignment

Diamond Couplings consist of only three major parts: two hardened steel sprockets and a length of two-strand Diamond Roller Chain. Moderate angular and parallel misalignment and shaft end-float is absorbed in the clearances between the chain and sprocket teeth. The load is carried at the greatest possible radius and spread over the entire chain length so that the strength of the chain greatly exceeds the requirements.

Ease and speed of installation, long-life dependable service and minimum maintenance are outstanding advantages of Diamond Flexible Couplings. Diamond Engineers will be happy to assist you with your shaft connection problems.

DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional
Dept. 606, 402 Kentucky Avenue, Indianapolis 7, Indiana
Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

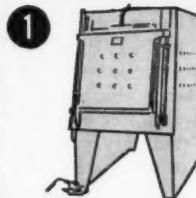


ROLLER CHAINS

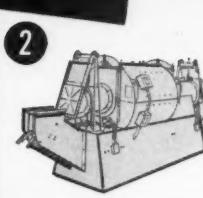


there's a *Pacific* built furnace for every heat treating need

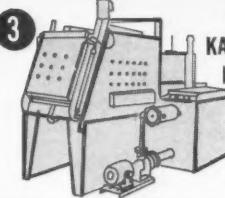
HERE ARE A FEW OF THE MANY TYPES
DESIGNED FOR IMPROVED QUALITY AND ECONOMY...



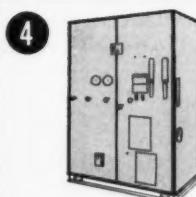
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HARDENING
FURNACES



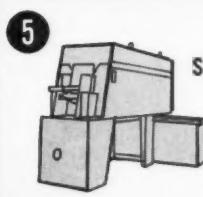
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HYDROGEN
BRAZING
FURNACE



PACIFIC
KARBOMATIC
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PACIFIC
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GENERATOR



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SHAKER-HEARTH
FURNACE



PACIFIC
FLOOD-AIRE
FURNACE



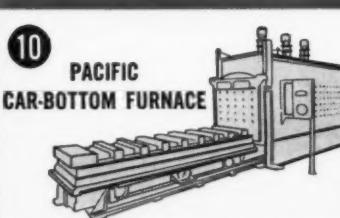
PACIFIC
CARBURIZER
NITRIDER
FURNACE



PACIFIC
BRAZING
FURNACE



PACIFIC
AUTOMATIC
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DU-AL LABORATORY
FURNACES
(3 models)

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large or small...standard or critical...there's a modern Pacific-Built Furnace for your exact requirements. A complete line of Pacific Furnaces and controls is available, and Pacific engineers can provide special designs for unusual jobs. For help in answering all your heat treating and furnace problems, call Pacific Scientific—there's no obligation!

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HEAT TREATING
EQUIPMENT

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1430 Grande Vista Ave., Los Angeles, Calif.

Please send free bulletins and specifications on
the items checked:

1 2 3
 4 5 6
 7 8 9
 10 11 12

Name _____

Company _____

Address _____

City _____ State _____

Please have a
Pacific Representative
call.

See us in Booth 365 at the Western Metal Exposition

March 1955—WESTERN INDUSTRY



Here's a bolt whose weakness is its strength!

Making a bolt that fails precisely when it should requires specialized manufacturing skills.

This is the job New Holland Machine Company, farm equipment manufacturers, turned over to RB&W. The bolt is used on the flywheel of a New Holland baler. "Critical" is a weak word for its importance to the baler.

If the baler picks up a foreign object such as a rock or stone, this bolt *must* snap to prevent gear breakage. But it can't fail too soon—when the baler eats up extra-heavy windrows, for example. If it failed every time this happened, the farmer would spend all day replacing bolts—instead of making hay.

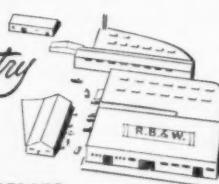
RB&W worked hand-in-glove with New Holland engineers in the tough job of heat-treating a standard machine bolt to these exacting specifications. It took a lot of ingenuity—but paid off. You can expect the same kind of service, cooperation and end product when you drop your fastener problem in our hopper. RUSSELL, BURDSALL & WARD BOLT AND NUT CO., Port Chester, N.Y.



UP TO TWELVE TONS OF HAY AN HOUR is the capacity of New Holland's Super 77 power take-off baler. With every minute vital in harvesting, farmers can't take

chances on machinery failure—so New Holland built rugged parts into the Super 77, gave it extra-large capacity for fast, reliable operation.

RB&W serves Western industry
with the complete quality line



WEST COAST PLANT: 4466 Worth St., Los Angeles, Calif. Other plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Additional sales offices: San Francisco, Dallas, Chicago, Detroit, Pittsburgh, Philadelphia. Sales agents: Seattle. Distributors from coast to coast.

110 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG



This 80-ton punch press makes the first medium draw in producing electrical outlet boxes; turns out approximately 12,000 units per day.



Whether or not you make electrical outlet boxes—

You can save money with the one right steel!

Using 14-gauge, hot-rolled coils from United States Steel, Bowers Manufacturing Company, Los Angeles, produces a wide variety of electrical outlet boxes. The photo above shows five steps in the fabrication of a box. After the initial draw, trim, and re-draw, the knockouts are formed and clamps and screws are installed. Finally, the outlet box receives an electro-galvanized plating. Using the one right steel enables this company to get more efficient production, fewer rejects, and results in money saved.

For every job, there is one particular steel that best suits the need. Evaluating your requirements and translating them into steel is our business. Isn't there some place in your plant where the one right steel could be saving you money today? One call to a Columbia-Geneva Technical Field Representative could be the answer to your problems.

Free!

UNITED STATES STEEL CORPORATION
COLUMBIA-GENEVA STEEL DIVISION
1403 RUSS BUILDING
SAN FRANCISCO 6, CALIFORNIA WI-3

Please send me your free wall chart, showing weights, standard sizes, and gauge of steel sheets.

Name _____

Address _____

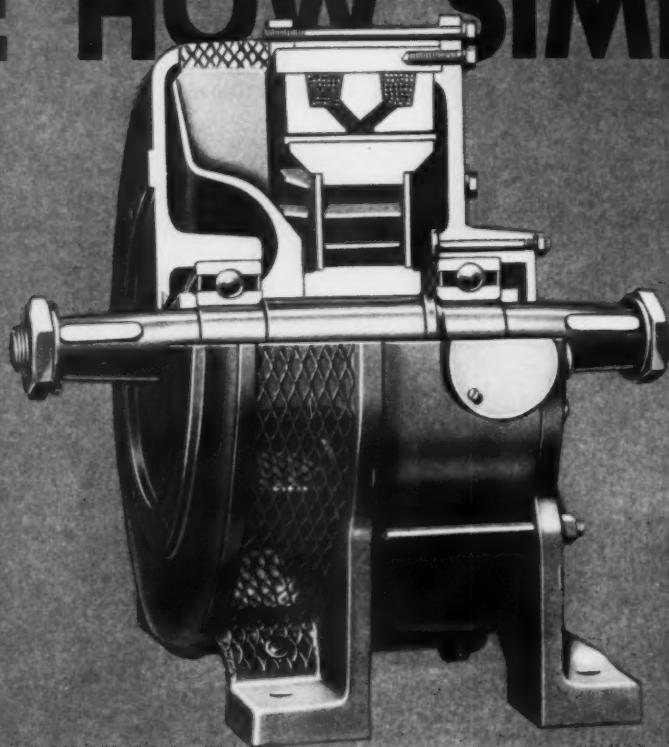
City _____ State _____



USS Steel Sheets

UNITED STATES STEEL

SEE HOW SIMPLE



... and only **P&H** overhead cranes have this better
AC CONTROL . . . **MAGNETORQUE***

Here is what all the talk is about in modern crane control. This is the P&H Magnetorque unit . . . so simple it never requires maintenance.

In this AC crane control there are no rotating electrical parts, never any adjustments to make, no replacements ever needed. With Magnetorque, braking forces are exerted electro-magnetically — without friction, without wear.

As for performance, *this* control provides infinitely fine speed-load characteristics. It's the most responsive crane control yet devised.

Magnetorque is only *one* of the features which distinguish P&H Overhead Cranes as leaders in the field. You can always look to P&H for what's new and better in overhead cranes — soundly backed by the experience of America's oldest and largest producer.

*T.M. of Harnischfeger Corporation for Electro-Magnetic Type Brake.

P&H PACIFIC DIVISION

HARNISCHFEGER CORPORATION

Plant, District Office and Warehouse — 2400 East Imperial Highway, Los Angeles 59, Calif.
San Francisco, 100 Bush St. • Seattle, 2909 First Ave., South • Denver, Rm. 415, Central Bank Bldg., 1108-15th St.



COMPARE FOR YOURSELF. This new literature contains speed-load curves for all types of crane controls printed on transparent pages so that you can compare one with the other. It clearly explains Magnetorque, has other helpful information. Write for Bulletin C-50.



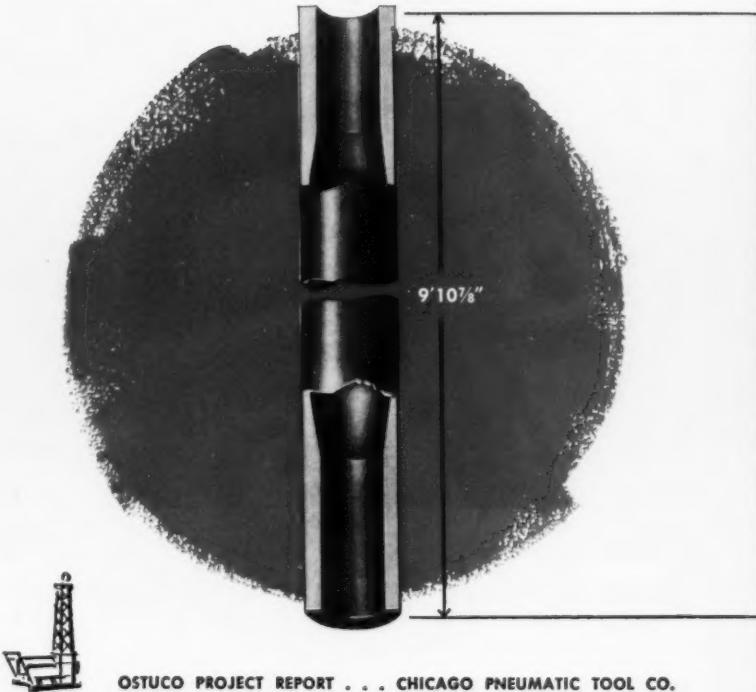
the P&H Line



See us in Booth 110 at the Western Metal Exposition

OSTUCO TUBING

**REDUCED DRILL
ROD WEIGHT 20%**
TO GIVE RIGS A LONGER REACH!



OSTUCO PROJECT REPORT . . . CHICAGO PNEUMATIC TOOL CO.

A well known method of test drilling is faster and more efficient with light-weight drill rod manufactured from 9' 10 1/8" sections of internally upset OSTUCO Tubing. Heavy-wall tubing once was considered necessary to prevent breakage at the threaded joint—but its weight shortened drilling depth of more practical, semi-portable drill rigs.

With internally upset OSTUCO Tubing, rod ends are thicker than the tube body which provides needed strength with 10 1/8 pounds less weight per section. Dead weight eliminated in the tube body amounts to over 2 1/2 tons per 5000 feet of drilling depth. This permits the use of semi-portable drilling equipment that handles much longer rods because of their lighter weight.

This application may spark an idea for you . . . how to save production time and cost with versatile, *special-quality* OSTUCO Tubing. And you'll be interested in OSTUCO's unique *single-source service*, where one order takes care of all details. Write for catalog, "Ostuco Tubing," or send your blueprints for prompt quotation.



OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING
—Fabricating and Forging

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • **SHELBY, OHIO**
Birthplace of the Seamless Steel Tube Industry in America

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SEATTLE, 3102 Smith Tower, Telephone Seneca 5393
CANADA, RAILWAY & POWER CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York



CRANE VALVES have longest life in this sulphur pit

THE CASE HISTORY—Leakage in steam lines to sulphur pit heating coils was hindering operations at International Minerals & Chemical Corp. plant at Lockland, Ohio. The condition prevented servicing of traps, strainers and the heating coils.

Valves that leaked beyond repair after as little as 6 months' service were the source of the trouble. Their seating as well as packing failed to stand up.

In January, 1953, after trying other types, Crane 14½P Plug Type Disc Globe Valves were installed. Today, they're still giving excellent service at low cost. Recently, the steam piping was completely replaced—the Crane valves were repacked and put back in the lines. That's all the maintenance they needed after 18 months in this severe service.

Crane 150-Pound No. 14½P Plug Type Disc Brass Valves

Long-wearing, hard seating surfaces in a rugged, well-proportioned, Crane-designed body make these valves exceptionally suited for steam and other severe services. Consult your Crane Catalog or your Crane Representative.



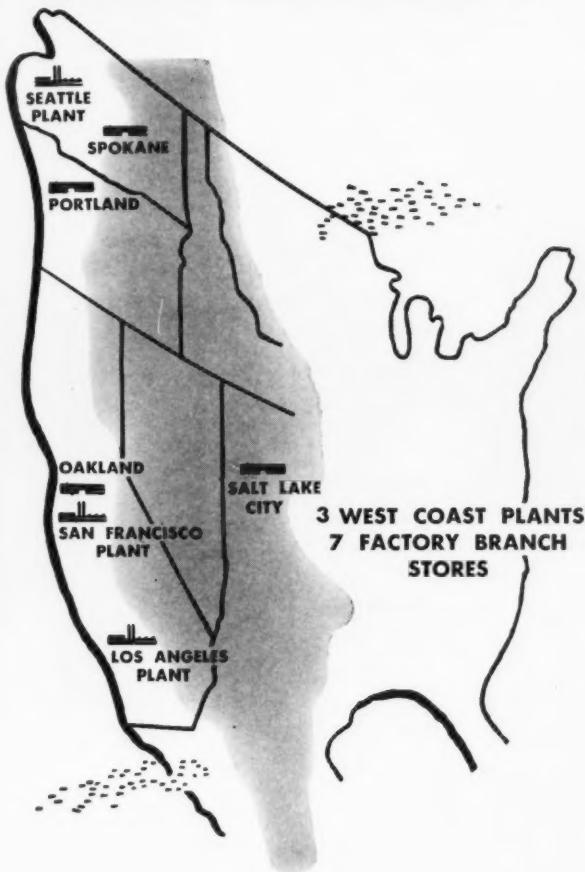
CRANE CO.

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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

CRANE'S FIRST CENTURY . . . 1855-1955

How Link-Belt serves West Coast industry



*from major engineered installations to
individual materials handling and
power transmission products*

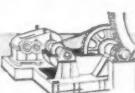
HERE'S a unique, all-inclusive service for West Coast industry. Our localized facilities offer complete engineering, manufacture and erection of entire plants or of individual conveying, elevating, processing and power transmission products. Get all the facts from the Link-Belt office near you. You'll find it pays to do business with Link-Belt.

One source . . . one
responsibility

for materials handling



power transmission



processing machinery



experienced engineering

Link-Belt is a world-recognized engineering firm. Our West Coast plants and offices have large engineering staffs with intimate knowledge of local conditions. Each plant is prepared to carry through complete installations from planning, manufacture and erection.



modern fabricating facilities

Link-Belt operates three modern plants in the West—at San Francisco, Los Angeles and Seattle. Not only do these facilities help speed deliveries—they also save money on freight costs compared to Eastern shipments.



convenient warehousing

In the seven major Western industrial areas, Link-Belt maintains over-the-counter service on a complete range of power transmission, conveying and elevating products. There are factory branch stores to serve you at Spokane, Seattle, San Francisco, Salt Lake City, Portland, Oakland and Los Angeles. In addition, 32 authorized stock carrying distributors in the West stock Link-Belt products.

LINK-BELT



LINK-BELT COMPANY: Plants, Sales Offices and Factory Branch Stores at San Francisco 24, Los Angeles 33, Seattle 4. Sales Offices and Factory Branch Stores at Portland 10, Spokane 10, Oakland 7, Salt Lake City 1. Stock Carrying Distributors in Principal Areas 13,709

announcing

**A COMPLETE
NEW LINE**
of HONAN-CRANE

OIL FILTERS

... the first in a series of important engineering developments by the

NEW Corporation . . .
HOUDAILLE-HERSHEY
OF INDIANA, INC.

"B" type Bulk Refill

For applications where oil must be kept absolutely clean . . . bulk Cranite medium provides depth purification. Bulk or cartridge type cellulose refills are available for fine filtering . . . permitting "custom" filtration.

All models have new Quick-Opening Lids

Purifier lid is fastened with swing bolts which one man can loosen quickly. Lid swings back for easy access to refills.



WRITE FOR
ENGINEERING BULLETINS
AND QUOTATIONS ON
ALL THREE MODELS.

new!

**EXTRA-HIGH
FLOW RATES**

new!

**QUICK-
OPENING
LIDS**

"F" type Full Flow

Designed for in-line installation at extremely high flow rates—25 to 800 GPM. Features low pressure drop—only 4 PSI across unit at 170 SUS. Uses new "FLO-PAC" pleated paper cartridge, removes particles down to one micron.



"M" type Multi-Cartridge

Available in eleven sizes with six different types of cartridge filter elements to give exact degree of filtration needed. New "FLO-PAC" and "KLEER-PAC" cartridges feature exceptionally high efficiency—large dirt holding capacity.

HOUDAILLE-HERSHEY OF INDIANA, INC.

FILTRATION DIVISION

662 WABASH AVENUE, LEBANON, INDIANA



"With Aeroquip We Can Make Hose Line Assembly and Installation in Minutes!"



Aeroquip hose lines are ideal for use when vibration is a factor—as on this air chisel.

**Says: Al Herbert, Superintendent
NATIONAL WELDING MANUFACTURING CO.**

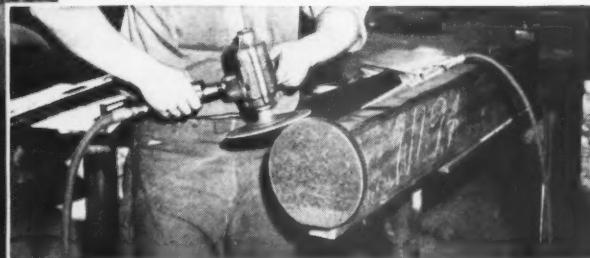
Newington, Connecticut



Like all fabricators, National Welding uses plenty of air and hydraulic lines on its equipment.

"We had worlds of trouble with pipe and fittings breaking from vibration. But Aeroquip solved this problem," says Mr. Herbert. "Now we are standardized on Aeroquip for maintenance purposes. We can cut the hose, make assembly and installation in a matter of minutes. This pays off, as speed is of great importance to us."

This cost-cutting 'Aeroquip idea' can save maintenance time in your plant too. See your distributor or write for full information.



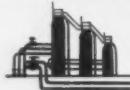
Aeroquip hose line on this air-powered tool withstands constant scuffing and abuse.


REG. TRADE MARK

AERO-COUPING CORPORATION

(A Subsidiary Of Aeroquip Corporation)
3015 Winona Avenue, Burbank, Calif.

SALES OFFICE and WAREHOUSE for } SPARKS-WILLS, INC., 1624 S. E. GRAND AVE., PORTLAND 14, ORE.
OREGON, WASHINGTON and IDAHO: }



Refinery



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KAY-BRUNNER

**makes Electric Furnace Steel
Castings for many of the West's
leading manufacturers**

For 26 years, Kay-Brunner has supplied castings for scores of this area's largest manufacturers*. Whatever your specifications, K-B has the facilities and know-how to make superior castings in any size from a fraction of a pound to a ton. Write or phone for a K-B representative.



Pumping



CARBON STEEL

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STEEL TO

SPECIFICATIONS



KAY-BRUNNER STEEL PRODUCTS, INC.

Foundry: 999 Meridian Avenue, Alhambra, California

Telephone: CUMberland 3-2141

*Names
on
request.



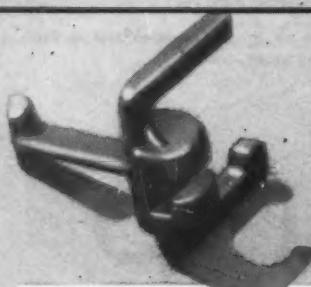
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Implements



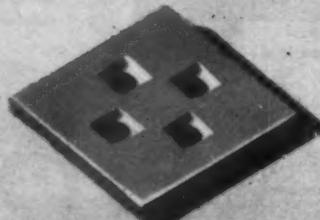
Valves



Machine Tools



Transmission



Ceramics



Excavators



These Westinghouse Fans Help You Increase Production . . . Employee Efficiency

Whatever your air handling problem . . . smoke, fumes, vapor, dust, wood shavings, granular material or ventilating . . . these Westinghouse fans are designed to handle or remove them . . . efficiently and economically.

INDUSTRIAL FANS (SERIES 700) . . . for dust collecting and conveying at high pressure. Wide range of capacities. Three types of wheels in 11 sizes.

1. Air Handling Wheel . . . particularly adaptable for general air handling and exhaust systems in removal of smoke, fumes and gases.

2. Material Handling Wheel . . . designed specifically for grinding and buffing wheel systems, and conveying materials such as chips, sawdust and grains.

3. Long Shaving Wheel . . . handles long fibrous materials that pass through the fan itself: trimmings from corrugated boxes, alfalfa, long shavings from woodworking machinery, rags, others.

INDUSTRIAL FANS (SERIES 500—MONOGRAM) . . . ruggedly built, with cast iron casing. For use as a blower or exhaust or

for dust control, collecting and conveying waste or raw materials, supplying air for furnace blast, drying, etc. Provides long, trouble-free service at low cost under severest operating conditions. In 10 sizes with wide range of capacity.

SERIES 900 VENTILATING SETS . . . compact, efficient, direct-connected and ready-to-run. Especially suited for small ventilating installations. Cleanable radial blade wheel design minimizes problem of handling airborne dirt and grease. Six sizes from 6" to 15" wheel diameters.

SERIES 1000 VENTILATING SETS . . . V-belt driven, self-contained. Install indoors or outdoors in a wide variety of heating, ventilating or air conditioning applications. Twelve sizes from 9" to 30" wheel diameters.

PROMPT SHIPMENT . . . these fans are available for immediate shipment from our Pacific Coast Plant—Berkeley, California. These rugged, powerful Westinghouse fans provide the most economical solution to your specific air handling problem. Get the facts from your nearest Westinghouse-Sturtevant office.

Sturtevant Division offices at: Los Angeles, San Francisco, California—Portland, Oregon, and Seattle, Washington—Pacific Coast Plant: Berkeley, California.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S *Westinghouse*

See us in Booths 344 and 477 at the Western Metal Exposition

Forthrightness pays

KENNECOTT COPPER Corporation is to be commended for its recent forthright action in telling what its employee relations objectives are, and for its willingness to bring the various levels of supervision into the process of deciding what those objectives are.

The company issued a statement of its labor policy which emphasizes the importance of each individual employee as an integral part of company activity, points out that the company and its employees have common aims, and is designed to promote harmonious and cooperative relationships with all labor organizations representing its employees. This does not necessarily constitute a change in labor relations, remarks J. C. Kinnear, Jr., Nevada Mines Division general manager, as to a large extent Kennecott has merely put down on paper the labor policy followed in the past.

Kennecott acknowledges unions as spokesmen for employees in many matters, encourages employees to take an active part in union affairs to insure democracy and responsibility, recognizes company obligation to keep employees and unions informed and the part played therein by supervisors, and encourages individual advancement.

A highly respected authority in the labor relations field points out to WESTERN INDUSTRY that this statement is noteworthy in that the company has reached the stage of evolution where its attitude toward labor unions includes recognition of the part which responsible labor unions can play in the operation of a successful business. The policy statement is a positive acceptance of the union as a force for good.

This authority calls attention to a second aspect of note in the distinction made between treating with the union for employees as a group and concern with employees as individuals. In the latter sense the company is pointing out areas of predominant interest and recognizing that a triangular relationship exists for the union employee, the employer, and the union on the job. Like the three-legged stool, each leg must hold up its part of the load or the load will fall.

An age of analysis

THIS IS the age of analysis in industry, as well as exploration, invention, and development. Every day the value of thinking things through, instead of doing first and thinking afterward, becomes more apparent. It is exemplified here in the West in the rapid acceptance of industrial engineering; even such old-line holdouts as lumber and food processing will be taking it up soon, whether they realize it or not. Even operations research, a term which has a terrifying sound, turns out on closer inspection to be nothing more than an extension of industrial engineering, an effort to think things through still further.

Fissionable fears

BACK IN THE DAYS of the depression we used to think that prunes, peaches, pigs, and people were the principal products of which there was too great a supply.

But plants (i.e., the industrial variety) took good care of the prune plurality by demanding big orchard acreages for building sites. Peaches decided not to be Orphan Annies but advertisable merchandise, and so let the country eat its way to freedom (for the peaches). Pigs? Frankly, we've forgotten what happened to them. Probably they are still around, but nobody worries much about them. People are still around, too, but somewhere along the line it is beginning to dawn on us that there is a job for everybody.

To be sure, our farm support programs have since built up a lot of new surpluses, yet eventually they will pass out of the picture somehow.

And now, believe it or not, here comes nuclear energy worrying about its surplus! At the Colorado Mining Association convention last month, Eugene B. Hotchkiss, vice-president of the Vitro Corporation of America, said that where the fissionable material is in solid form, as in most heterogeneous reactors, structural damage to the fuel element caused by irradiation effects may require fuel changes when perhaps even less than 2% of it has been consumed. This spent fuel, the "ash" of the nuclear power plant, intensely radioactive and toxic, must go through a complicated reprocessing cycle to prepare the unspent portion for re-use.

This presents the sobering possibility, according to Mr. Hotchkiss, that as much as 98% of the fissionable material might come back on the market as secondary metal. It could be true, say we, but so also is the saying "Today is the tomorrow you were worrying about yesterday."



an AMFORGE analysis saved \$39,000 for a customer

The invitation to analyze this housing for aircraft engine starters was a welcome challenge for AmForge engineers. Weight, as well as cost, was involved, as forgings in the past had been made solid.

Careful calculations were made and changes, based on forging experience gained through the past 50 years, were incorporated in a newly designed housing forging. In addition, grainflow in the redesigned part was thoroughly tested under the guidance of experienced laboratory technicians. The result—a stronger, superior quality AMFORGING weighing 15½ pounds less than before and at the same time, saving the customer \$39,000 in material costs alone. Initial drilling operation was eliminated. Cost of bore and face operations were cut in half and the balance of machining time was cut 10 percent.

This is but one of many examples of the savings that AmForge has been able to find for its customers through the use of an AMFORGE ANALYSIS. With new facilities at Azusa, California, AmForge offers all the benefits of its forging "know-how"—plus the added advantages of lower freight costs to West Coast manufacturers.

We will be happy to analyze your forging problems. Simply send us a sketch, blueprint or sample—no obligation, of course.

AMERICAN
Brake Shoe
COMPANY

AMFORGE DIVISION

109 N. WABASH AVENUE, CHICAGO 2, ILLINOIS

PLANTS: AZUSA, CALIFORNIA • CHICAGO, ILLINOIS

See us in Booth 209 at the Western Metal Exposition

March 1955—WESTERN INDUSTRY



The **MOST COMPACT** and **MANEUVERABLE** 5,000 pound Fork Lift Truck ever made!

Here, in the new Model 500, are the performance features you requested . . . NEW compactness and maneuverability previously found only in much smaller units. NEW power to spare for handling up to 2½-ton loads. NEW day-long efficiency under the most severe working conditions from both gasoline and Diesel models.

Here are versatile power, capacity and performance long needed in a compact, maneuverable fork lift truck. Find out how the new Towmotor Model 500 fork lift truck can meet your handling requirements . . . and turn more of your present handling costs into profit. For complete information, call or write your local Towmotor Representative, or TOWMOTOR CORPORATION, Div. 6703 1226 E. 152nd St., Cleveland 10, Ohio.

TOWMOTOR

THE ONE-MAN-GANG

FORK LIFT
TRUCKS
and TRACTORS

- ★ NEW Power and Compactness
- ★ NEW High In Maneuverability
- ★ NEW Handling Speed And Efficiency
- ★ NEW Driver Comfort
- ★ PLUS All Other TOWMOTOR Advantages

Manufactured Only By Towmotor Corporation—The Pioneer Maker Of Fork Lift Trucks

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

Meeting a need

Editor, WESTERN INDUSTRY:

Many thanks for the Western Outlook issue of your magazine. We feel that there is a definite need for such statistical forecasts confined to Western economic development apart from the more accessible national totals. The lead article, "Facing the West's Future," is especially valuable in that it predicts the future economic climate upon which the success of today's decision will largely depend.

In the article entitled "Views of the West's Future," excerpting could lead to misinterpretation. It might be desirable in your requests to the various executives to suggest a reasonable length, then, if possible, print the opinion in its entirety with identity of the author.

CHARLES F. PARKER
Assistant Treasurer
Union Oil Co. of Calif.
Los Angeles

Bright future

Editor, WESTERN INDUSTRY:

I want to compliment you on your January issue which outlines in a very comprehensive manner the story of Western growth and development. Much has been accomplished and there is stronger evidence that an even brighter future for Western industry lies ahead.

A. M. RIDDLE
Executive Assistant
to the President
The Colorado Fuel and Iron Corp.
P. O. Box 1920
Denver, Colo.

Small plant problem

Editor, WESTERN INDUSTRY:

It will be greatly appreciated if you can send me tearsheets for both Part 1 (September issue) and Part 2 (October issue) of the article entitled "Industrial Management Methods of Small Plants," by Louis E. Davis and Earl E. R. Jones.

G. L. LENTZ
Project Engineer
AiResearch Manufacturing Co.
Phoenix, Ariz.

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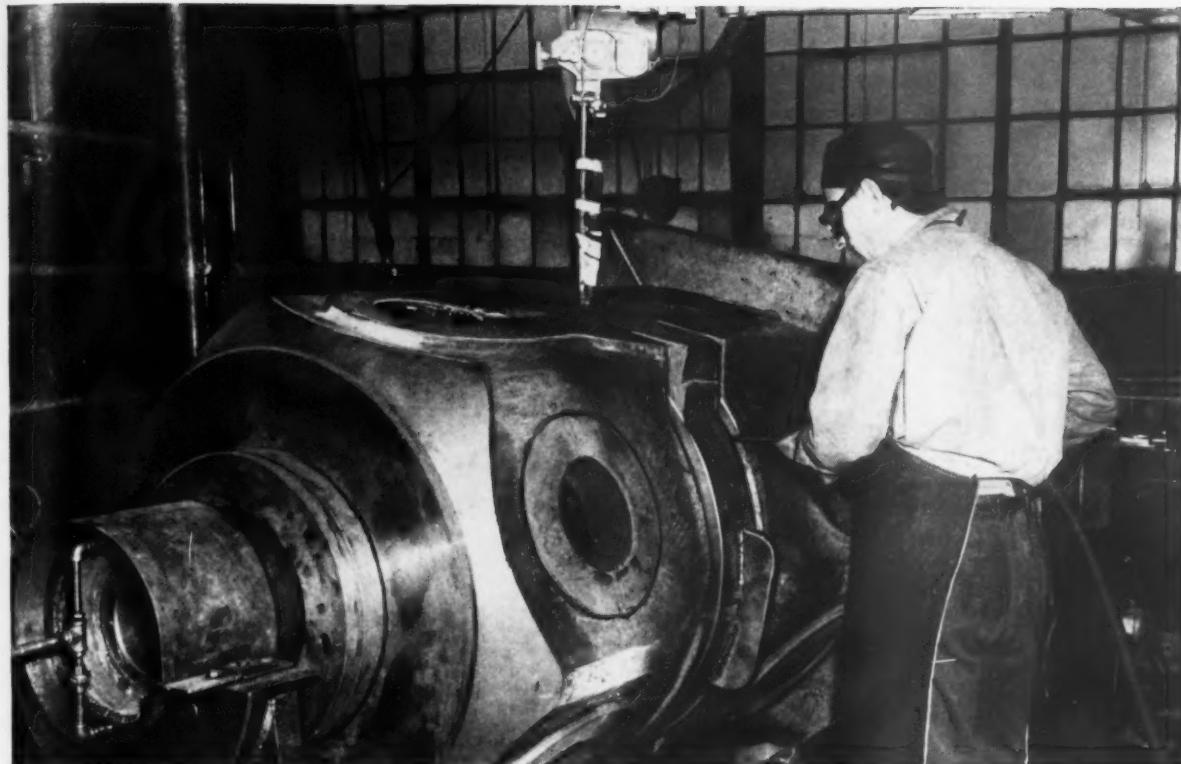
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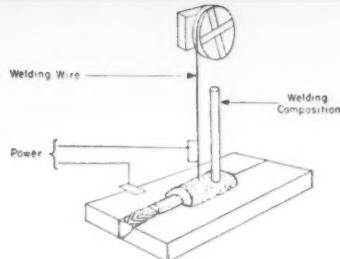
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1955



UNIONMELT Welding Solves "Impossible" Casting Job . . .



UNIONMELT welding solved the problem when a manufacturer was unable to make one-piece castings of compressor cylinders used in gas line pumping stations—other welding methods proved too slow and costly . . . UNIONMELT welding cuts 40 hours in production time, and produces high-quality welds that easily withstand pressure of 750 lb. per sq. inch.

The 42-in. diameter cylinder is cast in two halves, and has an internal piston bore with surrounding suction and exhaust chambers . . . The 2½-in. thick piston walls and 3-in. thick outer walls of each half are aligned and UNIONMELT welded.

Like many other products throughout industry, these

cylinders are being fabricated faster and more economically than ever before, because UNIONMELT welding offers:

- Higher welding currents than other welding processes . . . Up to 4,000 amperes . . . Joins metal of any thickness.
- Greater economy—½ to ⅓ less welding wire . . . Also uses larger-diameter, less-expensive wire.
- Use of any power supply—a.c., d.c., or constant potential . . . With c.p., no control is necessary to maintain constant arc voltage—welding is fast and more easily controlled.

Start saving now—call your local LINDE representative for more information and ask for Form 7942, "Modern Methods of Joining Metals."

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation

30 East 42nd Street  New York 17, N. Y.

Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto

The terms "Linde" and "Unionmelt" are registered
trade-marks of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

See us in Booth 495 at the Western Metal Exposition

March 1955—WESTERN INDUSTRY



now you can
use plating
where you
never could
before!

Kanigen®

can give you
new ideas about
NICKEL PLATING!

General American's new Kanigen *chemical* plating process overcomes many of the serious limitations of electro-plating. The simple patented Kanigen immersion process applies a uniform, controlled thickness of plate on *all* surfaces, interior and exterior. No bare or thin spots, no "build-up" even on big or complex parts. And Kanigen plating has the superior corrosion resistance of nickel, unusual hardness and durability.

A few of the ways companies are using General American's Kanigen plating service . . . how many fit *your* problems?

- **to simplify manufacturing.** Entire welded assemblies can be plated on a production-line basis.
- **to lower costs.** Carbon steel with Kanigen plate can often replace costly stainless steel.
- **to eliminate maintenance.** Pump parts, valves, pipes, conveyors, etc. can now be *plated* for long-lasting corrosion resistance.
- **to create new products.** Kanigen plating takes the shackles off designers!

Ask a General American engineer
how Kanigen can help you.



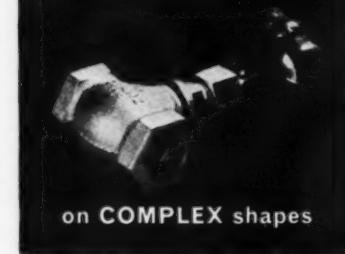
KANIGEN DIVISION

GENERAL AMERICAN TRANSPORTATION CORPORATION
12222 Olympic Blvd., Los Angeles 64, California

on
COMPLETE ASSEMBLIES



on **BIG** units



on **COMPLEX** shapes

Standard Engineer's Report

CASE HISTORY
Calol Vistac Oil

LUBRICANT

Hydril Co.,
FIRM Los Angeles, Calif.

Tacky oil eliminates loss of heavy-duty bearings!

IN 8 YEARS OF USING CALOL VISTAC OIL, the Hydril Co., Los Angeles, has not lost a single bearing in any of the 31 pieces of heavy-duty machining equipment in its plant (below). Calol Vistac Oil is used in bearings in the plant, ranging in size from $\frac{1}{2}$ " up to the 36" plain bearing that carries the six-ton table on the 84-inch boring mill at right. They report it keeps a lubricating film on bearings under extreme loads, saves the cost of down-time, parts, and labor formerly involved when bearings went out.

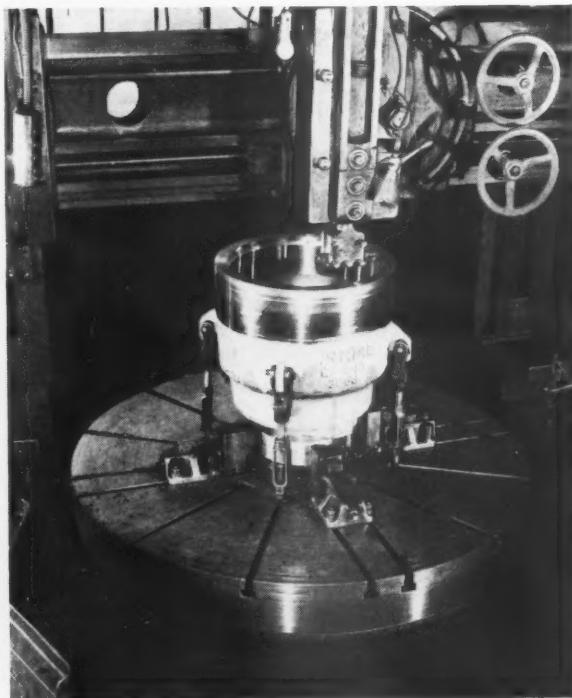


USED ON WAYS OF ENGINE LATHES in the plant, Calol Vistac Oil stays in place overnight and week-ends. It eliminates the trouble caused when previous oil drained off these precision surfaces, allowing grit to get into pores of the metal. They also use Calol Vistac Oil in all gear trains except worm drives. It comes in several grades to meet a wide range of operating conditions.

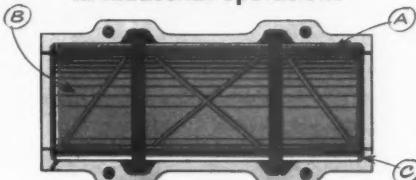
FREE CATALOG: "How to Save Money on Equipment Operation," will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write to 225 Bush Street, San Francisco.

TRADEMARK "CALOL VISTAC" REG. U. S. PAT. OFF.



How CALOL VISTAC Oil cuts costs in industrial operations



Has wide use range in heavy-duty plain bearings operating in hard service, air cylinders, reduction gears, motor gearheads, etc.; excellent air-tool lubricant—atomizes quickly and stays fluid at low temperatures.

- A. Additives help form oily, pressure-resistant film...sticks on slow-moving parts and resists high temperatures.
- B. Economical—small quantity will lubricate efficiently, dissipate heat.
- C. Tenacious film cuts power loss and wear.

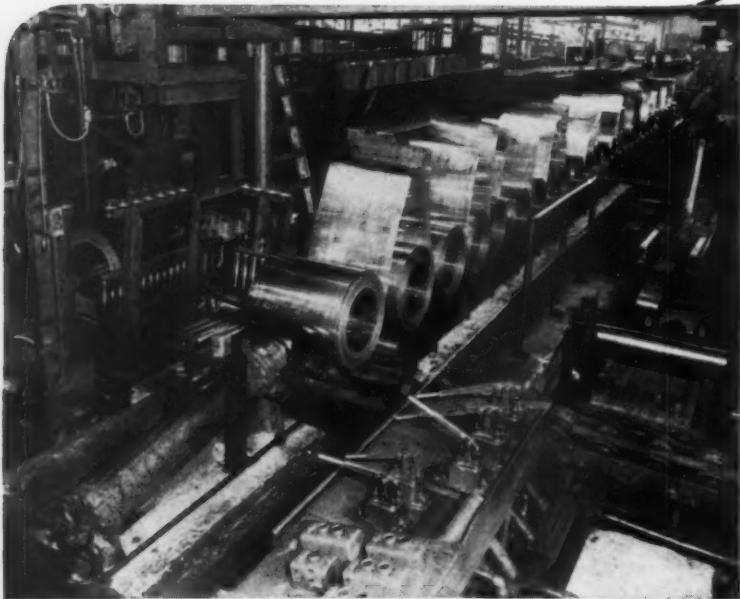
STANDARD OIL COMPANY OF CALIFORNIA

Automation

WE'VE WORKED TOWARD IT

FOR 50 YEARS AND CALLED IT

CONTINUOUS FLOW



Typical Mathews conveyor system made up of power conveyors and special conveying machinery in modern brass mill.

Mathews conveyors have for 50 years been helping manufacturers progress toward automation by handling materials to and from processing machines with a minimum of manual effort. Today, in almost every industry in plants throughout the United States and Canada, Mathews mechanized handling is at work creating a smooth, continuous flow of materials.

For information, write to the Mathews field office or plant nearest you. Ask for Catalog 853-R.



MATHEWS CONVEYER COMPANY WEST COAST
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Engineering Offices or Sales Agencies in Principal American and Canadian Cities

MATHEWS

CALENDAR OF MEETINGS

MAR. 14-18—*American Society of Tool Engineers*, industrial exposition and annual meeting, Shrine Auditorium and Shrine Exposition Hall, Los Angeles. Contact H. E. Conrad, executive secretary of ASTE, 10700 Puritan Ave., Detroit 38, Mich.

MAR. 14-25—*Natural Resources Conference*, regional, Davenport Hotel, Spokane. Contact Neal Fosseen, c/o Spokane Chamber of Commerce or telephone WA 6271.

MAR. 17-19—*American Society for Quality Control, 2nd Western Regional Quality Control Conference*, Benjamin Franklin Hotel, Seattle. Contact Dr. G. I. Butterbaugh, 210 Commerce Hall, University of Washington, Seattle.

MAR. 17-19—*Pacific Dairy and Poultry Assoc.*, annual convention, Hotel Utah, Salt Lake City. Contact Association office, 1304 E. Seventh St., Room 256, Los Angeles 21.

MAR. 18-19—*Arizona Industrial Development Conference*, University of Arizona, Tucson. Contact Dr. L. W. Casaday, Director, Bureau of Business Research, University of Arizona.

MAR. 18-19—*Pacific Northwest Oil Heat Convention*, Hotel Olympic, Seattle. Contact R. G. Almslie, Oil Heat Institute of Washington, 905 Lloyd Bldg., Seattle.

MAR. 25-26—*American Foundrymen's Society*, Calif. regional meeting, Huntington Hotel, Pasadena. Contact Wm. C. Baud, Food Machinery and Chemical Corp., 4545 Pacific Blvd., Los Angeles.

MAR. 25-27—*Western International Assoc. Refrigeration Service Engineers Society*, Tacoma, Wash. Contact Tacoma Chamber of Commerce.

MAR. 28-30—*Intermountain Logging Conference*, Davenport Hotel, Spokane. Contact Charles Keim, Big Fork, Mont.

MAR. 28-APRIL 1—*Western Metal Congress and Western Metal Exposition*, Pan-Pacific Auditorium, Los Angeles. Contact W. H. Eisenman, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

APR. 4-5—*First West Coast Conference on Applied Industrial Uses of Atomic Energy*, sponsored by Stanford Research Institute and Atomic Industrial Forum of New York City, Mark Hopkins Hotel, San Francisco. Contact Stanford Research Institute, Stanford, Calif.

APR. 6-7—*Electrical Maintenance Engineers Assoc. of Southern California conference*, University of Southern California, Los Angeles. Contact Association office, 1052 West Sixth St., Los Angeles 17. MU 1734.

APR. 6-10—*World Plastics Fair and Trade Exposition*, National Guard Armory, Exposition Park, Los Angeles.

APR. 13-15—*Society of the Plastics Industry, Pacific Coast Section conference*, Palm Springs, Calif.

... More on page 28.

proved, new methods of BIG-CAPACITY MATERIALS HANDLING



EXCAVATES, STOCKPILES, LOADS TRUCKS. This busy Allis-Chalmers HD-5G Tractor Shovel has the power to dig into hard-packed materials — and bring it out, a full $1\frac{1}{4}$ cu yd at a scoop. In handling light materials, an interchangeable 2-yd bucket can be used to boost output. Crawlers let this machine work anywhere, in any terrain, any weather. Steel tracks stand up in cullet and other sharp, abrasive materials.



FEEDS HOPPERS, CONVEYORS. Loading foundry sand into an elevator is just one of many tasks performed by the Tractor Shovel. It also breaks up and loads slag, removes snow, cleans out dust hoppers, handles coal, spots railroad cars, carries heavy castings from one department to another. Ten quick-change attachments are available to multiply its usefulness, keep it busy the year 'round.

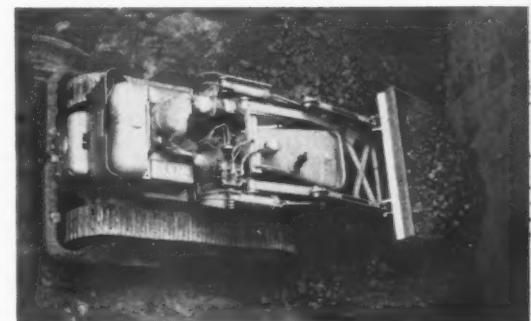
ASK YOUR ALLIS-CHALMERS INDUSTRIAL DEALER to show you how the versatile Tractor Shovel is helping improve handling methods for thousands of owners. There are four sizes to fit your needs from the $1\frac{1}{4}$ -yd HD-5G to the 4-yd HD-20G with torque converter drive. Also, write for catalog describing the use of tractors in modern materials handling.



SAVES STEEL PRODUCTION TIME. This HD-5G in an Ohio steel mill adds valuable days to the steel production time of 14 open-hearth furnaces. In cleaning out slag pits, it releases 13 laborers for other work, gets the job done in a fraction of the time. With trench-hoe attachment, it tears out old lining brick to speed rebuilding of furnaces. It is used also for loading wet loam, moving and placing machinery, excavating, other jobs.



LOGS ARE HANDLED IN BUT A FRACTION OF THE TIME required by former methods since this 135 net engine hp HD-15GC Tractor Shovel with lift tongs was put on the job. The Idaho owner reports it is fast, efficient, soft and extremely maneuverable for loading, unloading, carrying and placing logs — excellent for handling long ones of more than 2,000 bd ft. Lift forks and tongs for handling logs, pipe and similar loads also are available for the other three sizes of Allis-Chalmers Tractor Shovels.



UNLOADING LAST BIT OF IRON ORE FROM FREIGHTERS IS SPEEDED, and thus valuable sailing time is saved, by five HD-5G Tractor Shovels used by the Pennsylvania Tidewater Dock Company. They are lowered into the holds to clean out ore from corners and bulkhead edges and place it where it can be reached by the huge ore buckets. There are standard buckets on all five tractors for picking up and carrying the ore. These can be quickly replaced by a blade for pushing the ore or by a backhoe for reaching into unusually low or narrow places.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1 U. S. A.

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1955

GOODALL CONVEYOR BELTING

The Reliable Answer to Lower Handling Costs

The use of Goodall Belting for flat or incline conveying of bulk or unit material, gives time-tested assurance of *lower handling costs* resulting from maximum operating efficiency and important savings in maintenance and replacements. Every length is built to back up the Goodall reputation for "belting at its best."

"SUPER TRIPLE-S" — Goodall's finest Bulk Conveyor Belting . . . with a long-established record of outstanding quality and reliability. Used for handling crushed stone up to 10", ores, slag and other abrasive materials, wet or dry.

"TRIPLE-S" and "La Crosse" will serve with equal efficiency and economy in less severe services.



"HI-CLIMBER" (R) — The Incline Conveyor Belting with a special "Tentacle-Grip" molded surface that keeps packages from sliding or slipping on inclines up to 35°. Other brands available for flat or incline conveyors.

"SKY-KLEET" (R) — That name identifies specially-designed rubber cleats available on Goodall Conveyor Belting used for handling packages, small parts, stampings, minerals, chemicals, etc., on fixed or portable conveyors. Cleats are integrally molded to the belt, and spaced at any required distance.

Contact Our Nearest Branch for Details and Prices



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Houston • Goodall Rubber Company of Canada, Ltd., Toronto • Distributors in Other Principal Cities

CALENDAR

... Begins on page 26.

APR. 13-15—*Northwest Light and Power (Engineering and Operating Section)*, Davenport Hotel, Spokane. Contact Washington Water Power Co., Spokane.

APR. 18-20—*National Air Pollution Symposium*, Huntington-Sheraton Hotel, Pasadena, Calif. Contact Dr. A. M. Zarem, Stanford Research Institute, 621 S. Hope, Los Angeles.

APR. 19-20—*33d Pacific Coast Management Conference*, Claremont Hotel, Berkeley, Calif. Contact Everett Van Every, President, California Personnel Management Assoc., 2180 Milvia St., Berkeley 4, Calif.

APR. 19-20—*Northwest Wood Products Clinic*, Davenport Hotel, Spokane. Contact Everett Ellis, secretary, Box 291, University Station, Moscow, Id.

APR. 20-22—*American Management Assoc. orientation seminars*, Hotel Ambassador, Los Angeles. Contact Seminar Registrar, AMA, 300 W. 43rd St., New York 36.

APR. 22-23—*American Institute of Industrial Engineers, Inc.*, Western regional conference, Statler Hotel, Los Angeles. Contact Los Angeles Chapter Office, P. O. Box 25524, Los Angeles 25.

APR. 25-27—*American Management Assoc. workshop seminars*, Hotel Ambassador, Los Angeles. Contact Seminar Registrar, AMA, 300 W. 43rd St., New York 36.

APR. 28-30—*American Institute of Mining Metallurgical Engineers*, Pacific Regional conference, Davenport Hotel, Spokane. Contact Dr. F. R. Morral, c/o Spokane Chamber of Commerce, or telephone WA 1541, ext. 43.

MAY 8-10—*Pacific Northwest Trade Assoc. spring conference*, Hotels Vancouver and Georgia, Vancouver, B. C. Contact Association office, Vance Building, Seattle 1, Wash.

MAY 11-13—*Pacific Coast Electrical Assoc. regional convention*, Palace Hotel, San Francisco. Contact Victor Hartley, Executive Secretary, 50 West 16th St., Los Angeles 14.

MAY 26-27—*Electronic Components Conference*, Los Angeles. Contact Dr. Simon Ramo, Ramo-Woldridge Co., 8820 Bellanca Ave., Los Angeles 45.

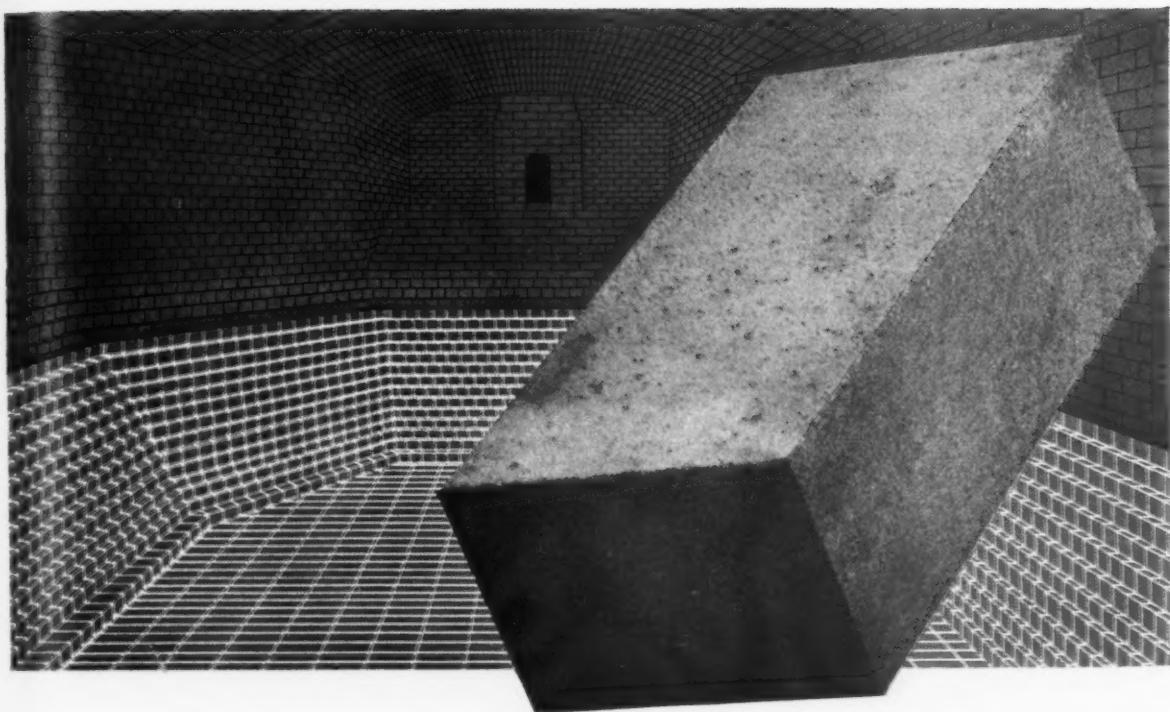
JUNE 6-10—*National Industrial Service Assoc.*, Statler Hotel, Los Angeles.

JUNE 15-17—*American Society of Training Directors*, annual convention, Ambassador Hotel, Los Angeles. Contact Ralph E. Wohlford, Publicity Committee, 15104 El Soneto Dr., Whittier, Calif.

JUNE 20-23—*Forest Products Research Society* national convention, Seattle.

JULY 12-14—*Second Western Plant Maintenance and Engineering Show and Conference*, Pan-Pacific Auditorium, Los Angeles. Contact Clapp & Poliak, Inc., 759 Monadnock Bldg., San Francisco.

AUG. 24-26—*Western Electronic Show and Convention*, Civic Auditorium and Fairmont Hotel, San Francisco. Contact Mal Mobley Jr., Business Manager, 344 North La Brea Ave., Los Angeles 36.



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MAJOR STEEL COMPANY ceramists have found that Permanente Periclase D-S Brick meets their requirements for the safest, most efficient sub-hearth refractory.

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Permanente Periclase D-S Brick has been *designed especially* to withstand conditions that exist in the sub-hearth and up to the slag line. It is made from pre-shrunk, accurately-sized Periclase grains derived from sea-water magnesia and has all the properties outlined by ceramists as most desirable.

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High MgO—Contains more than 95% MgO (165 pounds of MgO per cubic foot of brick).

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TA-1814(G)

New Color Movie

MEN, STEEL AND EARTHQUAKES

What causes earthquakes? How are seismic forces measured? Why do some buildings collapse during an earthquake while others remain undamaged? These and many other questions about earthquakes are answered in this interesting motion picture which dramatizes one of nature's most terrifying forces.

Now available to professional, educational and civic groups, this 16-mm color film runs for 28 minutes. Accompanied by factual narration, the causes and effects of earth movements are depicted graphically by animated scenes. In tracing the important steps in man's efforts to prevent the destruction of buildings and other structures by earthquakes, the color photography shows how sound structural design and the use of steel have proved highly effective in resisting strong seismic forces.

Of interest both to technical and general audiences, the film explains the various kinds of forces which buildings must withstand when earthquakes occur. Steel provides the great strength required by architects and designers to build structures that can resist earthquakes. Its role as a fabricated steel framework, and as reinforcing for concrete and other materials, is fully described.

The film takes a look behind the scenes at some of the earthquake research activities being carried on by leading universities, technical societies, and government bureaus. Such groups have contributed generously to the factual background of this Bethlehem Pacific production.

FREE ON REQUEST

The film is available without cost, except for return postage. We suggest that requests be made at least three weeks in advance of the date of showing in order to allow sufficient time for scheduling and shipment. Write to Publications Department, Bethlehem Pacific Coast Steel Corporation, 20th & Illinois Sts., San Francisco 19, Calif.



Sales Offices: Los Angeles,
San Francisco, Portland,
Seattle, Spokane



*These buildings withstood
strong earthquakes . . .*

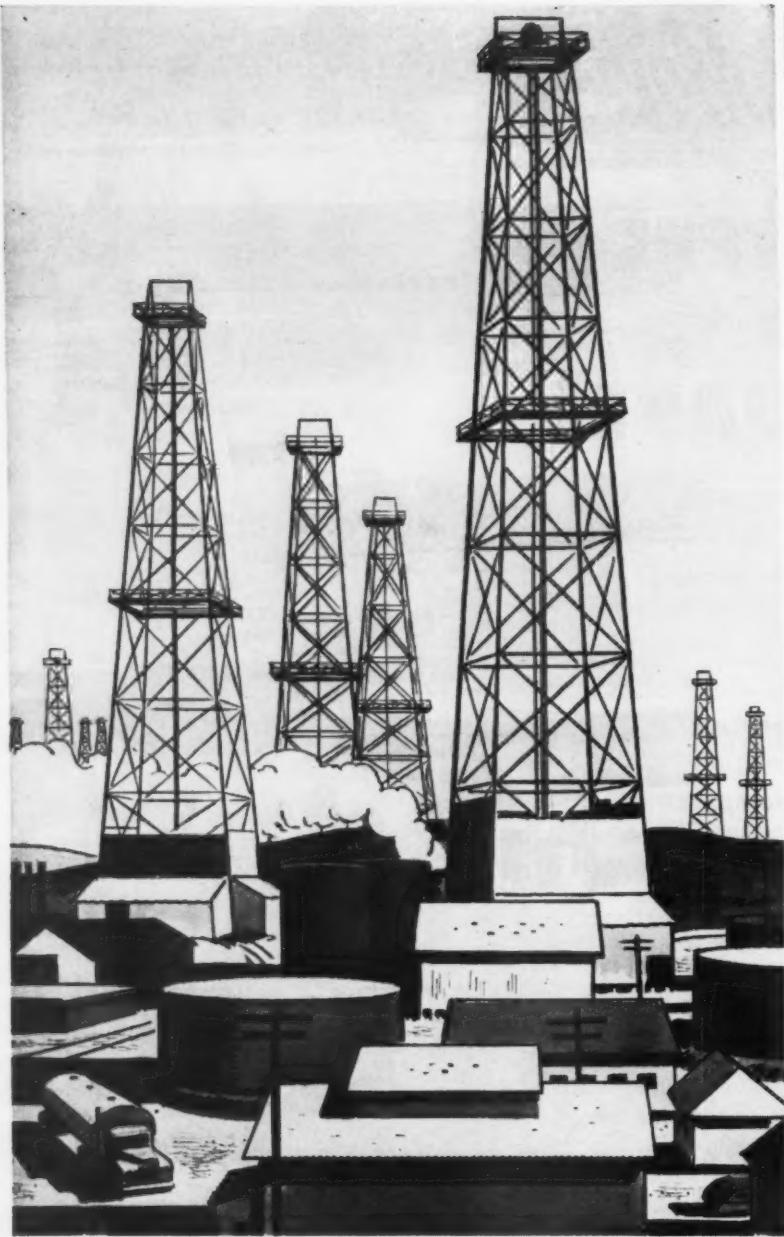


. . . but this one didn't



Earthquake research
helps to improve
building designs.

BETHLEHEM PACIFIC



THIS MONTH'S COVER

WESTERN STEEL

... a finger in every pie

GROWTH of the Western economy has followed a pattern closely resembling that of the activity in Western steel mills, and this month's cover picture shows how steel figures in the development of another of the region's principal resources—timber.

Wooden poles and railroad ties have to be treated with creosote to prevent rotting and deterioration with time. The creosote has to penetrate beneath the surface to make the job effective, and for this reason materials to be treated are put into a giant vacuum chamber where moisture is extracted in order to make room in the porous wood for the creosote.

Our cover shows a 33-ton, 8-ft. diameter steel impregnating cylinder fabricated at the South San Francisco plant of U. S. Steel Corp.'s Consolidated Western Steel Division. Poles and ties are moved into the cylinder on tracks welded to the inside wall. The end is closed and clamped into position by means of the bolting lugs attached to the flange. Then a vacuum is created inside and the material is creosoted under pressure.



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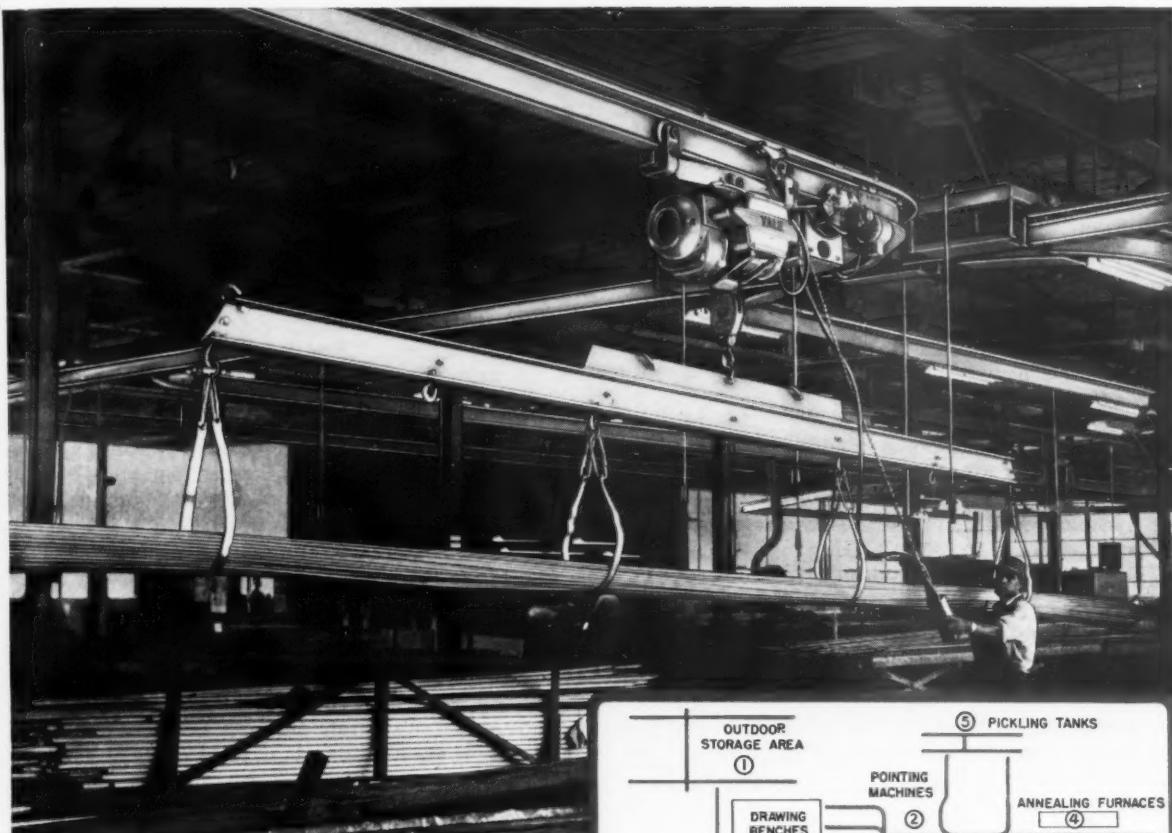
California Bank

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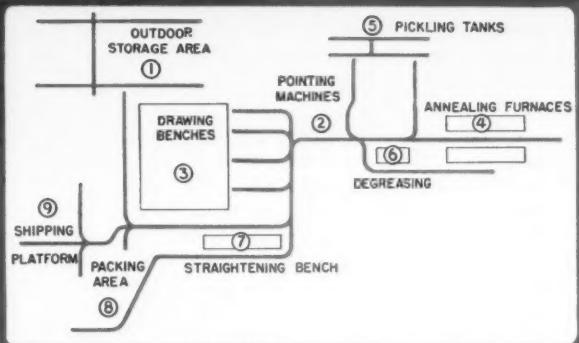
WESTERN steel also plays a part in supplying the West with heat energy in the form of liquid petroleum gas. Heavy steel plates are welded together to form the body of a large LPG storage tank also fabricated at Consolidated Western's South San Francisco plant. Finished tanks are of 30,000-gal. capacity and have a working pressure of 250 psi.

You can do it better with Louden engineered monorail!



Hard-to-handle materials or shapes? Let Louden's long experience lick it.

Louden pioneered monorail handling. This longest and broadest experience with this most adaptable and most flexible of all materials handling methods naturally offers many *extra* benefits to men seeking answers to any handling problems. Shown above is part of a Louden SuperTrack System in a well-known eastern factory where a Louden MotoVeyor makes easy work of the speedy handling of long, flexible, easily-damaged tubing. The hoist has 2,000 pounds capacity and the MotoVeyor travels at 125 feet per minute. This Louden Monorail System



also connects with the pickling house where a Louden Monorail Crane speedily and safely handles various sizes of tubing through the series of vats. Benefit by Louden experience on YOUR next handling problem.

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Since 1867—the first name in materials handling

What's New

IN STEEL FROM STOCK

In the news today are many developments of interest to those who specify, buy or work with steel. Ways in which you can raise efficiency and lower costs in your operations may be suggested by the following summary.

7½¢ per lb. saving on stainless sheets. Rising nickel prices are bringing back Type 430 straight-chrome stainless for mild corrosion applications. 7½¢ price advantage is real inducement and Type 430 may also be getting consideration as insurance against any shortage of nickel-bearing types. Ryerson has anticipated renewed demand by stocking Type 430 sheets in many gauges and sizes. Technical data on request.

Low carbon plates for easy forming and welding. If you've had trouble forming or welding carbon steel plates remember—steel produced to most popular warehouse plate spec. (ASTM A7) may have up to .35% carbon. To meet this problem, Ryerson now carries plates ($\frac{5}{8}$ " and lighter) produced to low carbon spec. especially for good forming and welding qualities. Also on hand: more sizes—more tonnage of carbon steel bars, shapes and sheets.

Revolutionary reduction in shop costs brought about by Ryerson's New Rycut 50 is the most important news to hit the alloy steel market in years. With this new .50 carbon leaded alloy, reductions in finished part costs of 25% or more are commonplace. Machining time is often reduced as much as 75% . . . tool life extended from 100% to 300% and production increased as much as 200%—all without known loss in mechanical properties as compared with standard alloys in the same carbon range.

A leaded alloy for every application is now available in the Ryerson Rycut series. Any one of them will typically cut your costs on machined parts by 25% or more. Use Rycut 20 when you need a carburizing alloy. Use Rycut 40 when you need a .40 carbon alloy, and New Rycut 50 for .50 carbon alloy applications. Also on hand in a growing range of sizes: leaded carbon-manganese bars—low carbon, suitable for case hardening, unusually fast machining.

New Ryerson stainless solves welding problems. Both stainless sheets and stainless plates in Type 304 L and Type 316 L have recently been added to the nation's largest stainless stocks—at Ryerson. In applications involving welding and stress relieving, where carbide precipitation may occur, these extra-low-carbon stainless steels can often replace expensive stabilized types.

Save 30% with Type 302 ornamental stainless tubing. Another recent addition to Ryerson stocks, this tubing is priced substantially below comparable stainless tubing for other than ornamental purposes. Yet it is more than satisfactory for many applications such as in restaurant and hospital equipment, etc.

Same day deliveries . . . tighter quality control. On as high as 98% of all regular warehouse orders, Ryerson is now cutting and shipping steel the same or following day. And this steel is now protected by a whole new set of quality control standards. As evidence—we can furnish a certificate of analysis or a mechanical properties report for every pound of steel shipped.



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Western engineering "know-how" solves tough lubing problem

System devised to supersede hundred-year-old method for the railroads



By
**ALF. E.
 WEROLIN**
 Vice-President and
 General Manager
 National Motor
 Bearing Co., Inc.
 Redwood City,
 Calif.

In our executive group we consider our development of a revolutionary new system of railroad lubrication an outstanding example of what can be accomplished when needs are clearly and fully analyzed, when the problems relating to them are understood in detail, and when a progressive scientific approach is undertaken for the solution of those problems.

Design and chemical research leading to perfection of these devices was, of course, costly. However, in view of the tremendous new market which has been opened up to our company, this investment is confidently expected to bring our company a handsome return.

For over a hundred years the railroads of our country have been concerned with the problem of lubricating

"HEIGHTENED recognition of the West as a source of industrial and technical know-how" was stressed by one of the contributors to the "Views on the West's Future" feature in the January Western Outlook number of **WESTERN INDUSTRY**. The development described in the accompanying article is a good example of it.

Following nearly three years of exhaustive testing on captive cars of the Union Pacific, Southern Pacific, and Western Pacific railroads, a new lubricating system for plain bearing type journal boxes of railway car trucks developed by National Motor Bearing Co., Inc., has been approved by

the Association of American Railroads for installation on 10,000 freight cars in interchange service. (Captive cars are those which do not leave the tracks of the owner road; interchange cars are those which may be routed over the lines of any and all railroads in the U. S. and Canada.)

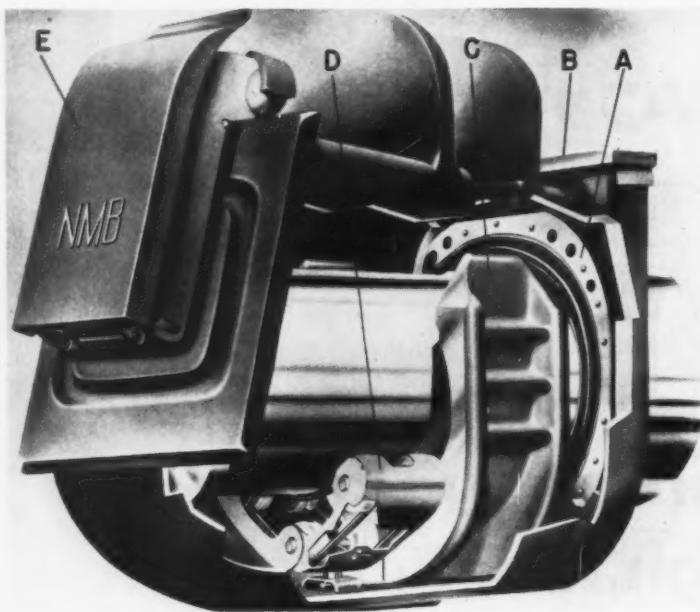
Because the new system gives promise of saving the railroad industry many millions of dollars per year, **WESTERN INDUSTRY** asked Alf. E. Werolin, NMB vice-president and general manager, to discuss the problem which NMB has solved and the steps leading to the solution.

the axles on freight and passenger cars. It was just about a century ago that railroads adopted a system of using an oil soaked mass of threads, called waste packing, to apply oil to car axles. The axle, in turn, carried the oil up to a solid bearing lined with babbitt, commonly referred to as a "brass" by railroad men.

The waste acts as a wick to carry oil

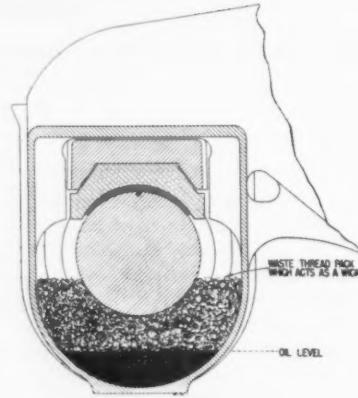
from the bottom of the box to the axle or journal, which then conveys the oil to the babbitt lined bearing on which the weight of the car rests. This is the lubrication system in effect on over 2,000,000 freight cars in the United States, and also on many passenger cars.

Of recent date, many new freight and passenger cars have been equipped



ABOVE: NMB freight car journal box. Oil seal (A) for the wheel side of the box prevents loss of oil and excludes harmful dirt and water. Filter cap (B) permits air to enter and leave the box but does not allow entrance of dust or water. Guard bearing (C) prevents the journal from scraping the journal box when the car is braked or coupled. Mechanical oil circulator (D) provides a constant bath of clean oil to all parts whenever the car is in motion. New type front lid (E) pressure seals the front of the box.

RIGHT: Waste pack system of lubricating freight car journals.



with roller bearings and the benefits obtained from the use of roller bearings are, of course, well recognized. Despite the progress made in applying roller bearings to railroad cars, there remain a tremendous number of freight and passenger cars which continue to operate with the waste pack lubrication system.

Since almost the dawn of railroading, hot boxes have been one of the railroads' most costly and troublesome problems. Some years ago it was established through studies conducted by the railroad industry and by independent agencies that the cause of the big majority of hot boxes is this antiquated waste pack system of lubrication.

It was demonstrated that all too frequently bits of thread from the waste pack are caught by the revolving journal and carried up under the bearing, where the thread lodges, causing friction which generates excessive heat and often ignites the lubricating oil. This causes bearing failure and other damage to mechanical equipment which, in turn, causes serious and costly railroad accidents. The railroads, of course, are alert to the possibility of hot boxes developing during train operation, and have worked out definite preventive maintenance procedures and other measures to reduce the frequency of and damage from hot boxes.

The waste system has other disadvantages.

Friction of the waste against the journal causes heat which accelerates journal fatigue; and if the waste pack becomes dislodged as a result of violent coupling, an inadequate supply of oil to the bearing may cause bearing failure. And at no time does the waste wick provide sufficient circulation of oil to obtain the cooling effect on parts within the journal box which is desirable when trains travel at high sustained speeds.

Dirt and water

Yet another disadvantage: The journal box is not sealed against dirt and water, although a so-called wooden dust guard on the wheel side of the box reduces entrance of dirt and water. Dirt and water, of course, are well known enemies of bearings and other moving parts. Even a little grit mixed in with the journal box oil is enough to cause excessive wear on journal box bearings.

Recognizing these problems, several railroads and a number of inventors have tried over the past few years to develop devices which would seal the journal box against dirt and water and replace the waste wick as an oil conveyor. To date none of these devices have proven satisfactory.

The problem of inadequate lubrication of railroad car journals and the entire hot box problem was brought to the attention of our company over three years ago. We were asked to develop an oil seal—which is our main line of business, but primarily for automotive and industrial uses—so designed as to fit in the conventional journal box. The function of this oil seal would be to permit lubricating oil to be placed in the journal box, without any waste packing, and to prevent the oil from running out of the rear end of the box. Another function of the seal was to keep dirt and other foreign material from entering the box at this point.

Specifications

At the outset, our design engineers were given these specifications:

1. Develop an oil sealing device which could be installed in or attached to a conventional box without altering or machining the box.
2. Determine if any other devices, in addition to the oil seal, could be employed to improve the lubrication of present journals and babbitt-lined bearings. If such devices were needed, these would also have to be designed so they could be installed in present type boxes.
3. Whatever devices were designed to eliminate waste packing and im-

prove lubrication must be capable of being manufactured and installed at a cost well below the conversion cost of going to a roller bearing system.

After considerable study, laboratory experiments, testing, and field trials, it was determined that a practical and economical system of lubrication and dirt exclusion could be developed for present-type friction bearing journals. To do this, five separate problems were subjected to extensive research and product development. These were:

1. To provide some means for excluding foreign material and preventing lubricant leakage at the *rear* of the journal box.

2. To develop a means for more positive gasketing for the *front* journal box opening. It was found that most present journal box lids did not prevent oil contamination or loss of lubricant.

3. To discover some means of protecting the surface of the journal from being cut or damaged whenever there is heavy braking application or severe impact during switching of cars. If this shaft surface is damaged, no oil seal could possibly function.

4. To design a device which would circulate the lubricant now free of waste packing in the journal box and which would ensure a positive and generous application of oil to the journal and bearings regardless of oil level.

5. To provide a means of preventing dirt and water from entering the dust guard well at the top of the journal box and relieve any pressure which might be built up in the box.

Five device system

The final system of lubrication developed by our research staff consists of five functionally integrated devices. Each device has an important function to fulfill in order to improve the lubrication of both journal and solid bearing and to prevent hot boxes.

In the following paragraphs each of these five problems and the devices developed to overcome them are discussed in some detail.

Problem One: Prevent lubricant leakage at rear of box.

Observation of a typical railroad car truck in travel reveals that there is not only considerable lateral movement of the journal with respect to the journal box, but also frontal action when the car is braked or coupled. This frontal action is sufficient to cause impact of

the axle with the journal box frame whenever the car is coupled at high speed or when there is heavy braking.

Our engineers were able to accommodate these two types of motion—lateral and frontal—by designing a seal of rubber bellows type construction which afforded high flexibility. To keep the sealing lip snug about the axle during flexing, a flat washer is imbedded in the synthetic rubber sealing compound. It should be remarked that a special new type of rubber compound had to be developed by our research chemists to provide qualities of toughness, flexibility, and endurance over the wide temperature range through which railroad cars operate.

There was also the problem of sealing against the rough inside surface of the dust guard well into which the sealing device was to be inserted. This was accomplished by means of a soft, ultra-flexible synthetic rubber gasket which accommodates itself to the irregularities of the casting when forced against it by spring pressure. The spring pressure provided also serves the purpose of keeping the sealing device firmly in place after it is located concentrically with the journal.

Problem Two: Prevent leakage at front of box.

Railroad car trucks endure terrific vibration as they travel at high speeds over the rails. We found that no conventional journal box lid existing was protected against this vibration, with the result that its bolt wore down and the closure became loose. We solved this by designing a new type spring-leaf loaded, synthetic rubber gasketed lid which seals the box opening hermetically. When closed, the lid fits so tightly (200 lb. force) that it cannot vibrate; accordingly wear of bolt and lid lugs is eliminated.

Problem Three: Protect the journal against damage during coupling and braking.

Here again there was a dual problem of material as well as design. A certain amount of frontal movement was desirable. Also, in the interest of minimum friction, it was not desirable that the journal should be in constant contact with any protective device. Furthermore, the material was required to be of such a nature that neither it nor the journal would be damaged by heavy impact or braking.

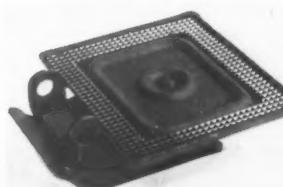
The solution was a pair of cast iron guard bearings lined with yet another



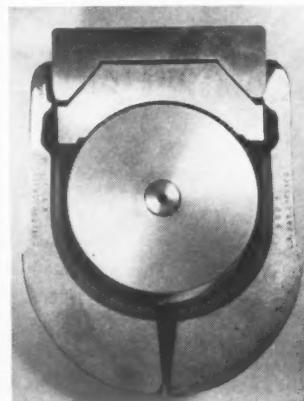
JOURNAL box oil and grease seal



NMB journal box lid



JOURNAL box lid sealing gasket



GUARD bearings



NMB oil circulator

special synthetic rubber compound which we developed for this purpose. In their normal position they are not in contact with the journal. On impact the journal may strike the rubber surface of one of the J-shaped bearings. Since the shock of such an impact is thus absorbed by the guard bearings, the journal surface where the oil seal rides is protected and undamaged.

Problem Four: Provide lubricant circulation.

Experience with lubrication problems in the automotive industry over many years has revealed that optimum lubrication is obtained by a constant circulation of oil over all moving parts. This not only ensures an adequate supply of lubricant but also provides a cooling effect.

In the railroad journal box, power to activate a mechanical circulator is available from the axle whenever the car is in motion. Accordingly, we devised an arrangement of nylon wheels and rubber belts which conveys the oil to all parts of the box, assuring bearing lubrication.

The device is placed in the bottom of the journal box so that the four upper nylon rollers are in contact with the journal. When the journal rotates,

the rollers turn, causing the rubber belts to move also. The two belts carry oil to the journal, and as the car picks up speed, tend to spray the entire interior of the box and all its parts with a generous supply of the lubricant. This action occurs regardless of oil level and ensures the application of lubricant to the important bearing area.

Problem Five: To exclude entrance of dirt and water at the top of the dust guard well and to relieve air pressure.

We accomplished this by fitting a nylon mesh filter over the top of the oil seal in the dust guard well. Over that a metal dust guard cover with an air escape is locked into place. Whatever dust might be sucked under the cover through the small air escape is caught by the filter. Also vaporized oil from the box is condensed on the filter and drops back into the box.

The dust guard well cover thus permits relatively free breathing of the box when there is movement or temperature change. This action protects the oil seal against excessive pressures. Note that the edges of the cover are formed to drop over the well and prevent entry of dirt or water.

After an average of more than

90,000 car miles of road tests on each of ten fast merchandise cars in regular service on the Union Pacific Railroad, all component parts of the NMB lubricating system are still in good condition. Positive sealing has been maintained at both ends of all journal boxes. Axles remain smooth as a result of guard bearing protection.

Babbitt linings of the main bearings show much less wear than those in waste packed boxes, and it has been established that boxes with our devices travel at temperatures at least 50 degrees cooler than waste packed boxes. Whereas waste packed boxes must be inspected and have oil added about every 200 miles, the NMB equipped boxes are opened for inspection only at thirty-day intervals.

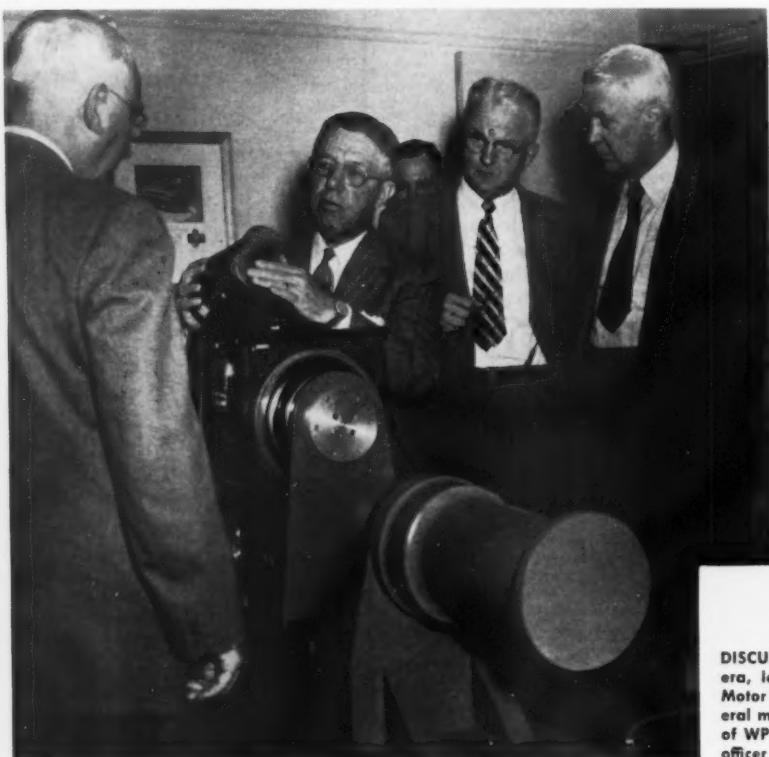
Oil consumption in the NMB boxes is only 10% of that in waste packed boxes. Shorter tests on Southern Pacific and Western Pacific freight cars show similar results.

10,000 installations

Recently the research laboratory of the Association of American Railroads completed extensive tests of the devices just described. Approval has now been received for installation of NMB equipment on 10,000 cars in interchange service—that is, cars free to travel off the lines of the owner roads. Already several railroads are placing orders for conversion of an appreciable number of their cars to this revolutionary lubricating system. Other roads are making their own independent tests before authorizing large scale changeover.

Because the NMB devices eliminate the cause of at least 81% of all hot boxes (based on studies of railroad industry experience); because oil consumption is reduced about 90%; because bearing and journal life is greatly extended and because other maintenance costs are reduced, the savings which result add up to an impressive figure.

A conservative savings estimate is over \$100 per car per year, on the average. Since there are over 2,000,000 freight cars on American roads, the potential savings to the railroad industry may be expected to aggregate over \$200,000,000 per year when conversion to this new lubricating system becomes general.



DISCUSSING the new lubricating system are (facing camera, left to right): L. A. Johnson, president of National Motor Bearing Co.; H. C. Munson, vice president and general manager of Western Pacific; F. B. Whitman, president of WP; and (back to camera) E. T. Cyler, chief mechanical officer of WP.



By
DAVID L.
DEHLINGER
Engineer
Larsen-Hogue
Electric Co.
Los Angeles

THE tendency to scrap and replace damaged polyphase induction motors is more prevalent than need be. Many times damaged rotors, broken frames or end bells, and damaged shafts are falsely assumed to be beyond economic repair.

One of the most expensive single repairs to an induction motor is a complete rebuild on the squirrel cage rotor winding. This is especially true if the cage is cast aluminum.

Several points should be considered before deciding to replace a rotor. First, the overall condition of the motor must be considered, the condition of the winding, the bearings, the shaft surfaces, and so forth. Then the actual cost of a replacement rotor should be determined.

Quite often the motor is designed either physically or electrically for a special application and a new replacement is more costly in both money and time than a standard stock motor. Very often the cost of rebuilding a rotor is offset by the time saved in getting the motor back into production.

Assuming it has been decided to rehabilitate the motor, the next thing to determine is whether to secure a new rotor or to rebuild the damaged one. Replacing with a new rotor depends on the availability and cost compared with the cost of rebuilding.

It is a good practice on a completely damaged aluminum cage winding to remove a portion of the end ring and check the shape and size of the bars. Many different shaped rotor bars are encountered, due to the design requirements for different motor operating characteristics. Removing a portion of the end ring may determine immediately that the rotor cannot be rebuilt with stock sizes of copper or copper alloy bars.

The quickest method of removing the aluminum bars in a squirrel cage rotor is by melting. Another but slower method is to soak the cage in a hot caustic solution.

When rebuilding the cage of a rotor, it is highly important that the

That damaged motor: very likely you can save it

electrical resistance be kept very close to that of the original design. Aluminum has approximately 50% of the conductivity of copper, thus necessitating copper bars and end rings with one half the cross sectional area of the original.

It is usually possible to locate a copper bar which gives a drive fit in the empty slots. The slot is usually irregular, and a rectangular bar with one half the area will bear on enough points to prevent vibration. If not, non-metallic wedges or a dip and bake in varnish will tighten the bars.

When the original material is all copper, it is merely a matter of duplicating the size and shape. If any part of the material is a copper alloy, the relative resistance of the alloys can be determined, and when the material cannot be duplicated, a change of material and a change of cross sectional area is necessary to arrive at the original resistance, keeping in mind that the volume of the conductor must be large enough to absorb abnormal heat generated during starting and peak load periods.

Reference to photograph below shows the material to be used in re-

building a special high torque rotor using a duplicate of the original materials. The end rings were cut from Muntz Metal plate with a band saw and the slots were milled. Muntz Metal is a copper and zinc alloy with 28.4% conductivity of pure copper. The bars are pure copper.

The other picture illustrates the final operation on the same rotor. A good welding job is very important to good performance. Eutectic rod 180, manufactured by Eutectic Welding Alloys Corp., is being used as it has a special design for thin walled and intricate copper parts. It has a low bonding temperature (1290 deg. F.) and possesses exceptional wetting and thin flowing characteristics.

After the parts were assembled and Eutectic flux 180 applied to the joints, the metal was broadly heated with a neutral flame from an oxygen acetylene torch using a large tip for maximum coverage. When the flux melts and flows it indicates the approximate bonding temperature has been reached and the alloy should be applied with continued heating until the alloy flows through the joint. The high capillary attraction together with



REBUILDING material duplicates original.



FINAL welding important to top performance.

its fluidity and wetting power enable it to penetrate close fits.

The fact that a rotor has developed open circuits does not always mean it has to be completely rebuilt or discarded. Quite often the breaks can be located and are accessible for repair. This is especially true on copper and copper alloy cages. Even cast aluminum rotors can be repaired when the failures are in the end rings, where the break can be widened and welded with an aluminum rod.

Other conditions which might appear discouraging if not hopeless to the motor users are broken frames and bearing brackets, badly worn pul-

ley surfaces, keyways, and worn bearing surfaces.

Ordinarily a broken or cracked frame can be held in place with clamps until parts are tacked together. Broken feet can be accurately located by setting the unit on a true flat surface and clamping the loose feet to the surface. Bearing brackets or end bells can be held true by bolting to the motor frame.

The broken parts referred to are generally cast and can be successfully welded by an arc using a high nickel content rod. Thick castings should be chamfered before welding, which is very easily done with a new chamfer-

ing rod which is now available.

Worn or bent pulley surfaces and worn keyways, even on large equipment, are easily repaired by building up the damaged part and remachining to standard size.

Worn bearing surfaces for both sleeve and ball or roller bearings can be easily repaired by the metal spray process, which builds up the worn surfaces to a point that allows turning or grinding to size. Metal spray materials are made in different alloys the same as welding rod, allowing the worn parts to be repaired to the proper hardness and corrosion resistant properties.

By IRWIN KOENIG
Consulting Engineer
Los Angeles

IN THE general classification of industrial, helical gear reducers, two basic types are commercially available. These are commonly known as the concentric shaft type and the parallel shaft type.

The concentric shaft type, as the name implies, has its input and output shafts in line. This is accomplished in design by having the low-speed gear center double back on the high-speed gear center. In the parallel shaft type the input and output shafts are offset from one another by a distance equal to the sum of the high and low-speed gear centers.

Qualitywise, there is little to choose between the two types. Properly selected units of equivalent capacity will render equivalent service.

Because the configuration of the concentric type lends itself more readily for adaptation to other products and because it is more suitable for economical manufacture, this design is generally developed for output torque capacities in the popular range of 1,000 to 100,000 in.-lb.

Parallel shaft units are made in sizes ranging from 5,000 to 1,000,000 in.-lb. of output torque. Because the parallel shaft type is made for the larger sizes, the misconception that it is the more rugged construction has been created.

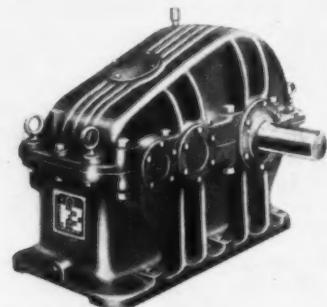
Because of its flexibility product-wise, which helps create larger volume production, and because of other inherent manufacturing advantages, the concentric shaft type reducer can generally be purchased at a lower cost than an equivalent size of the parallel type.

The accompanying curve is an indication of the relative prices of the two types of units as quoted in one manufacturer's line of reducers.

How to get lower first cost on helical reducers

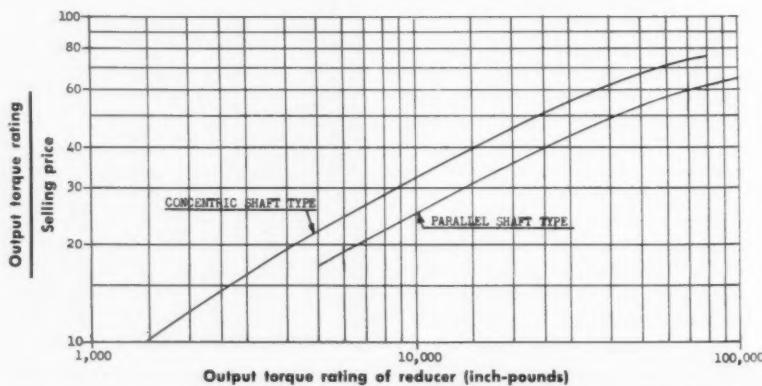


Concentric shaft type reducer



Parallel shaft type reducer

RELATIVE SELLING PRICE OF CONCENTRIC AND PARALLEL SHAFT HELICAL REDUCERS





PIGMENTS are loaded into a hopper, after which they mix with the vehicle and go into the paint mill.

Small Western manufacturer splits open his market

Colorizer system offers benefits to manufacturer, dealer, consumer

A REVOLUTION has taken place in the paint industry since the time, just a few years ago, when paint manufacturers produced only a limited choice of colors and the customer was in the position of having to take it or leave it.

Seeds of the revolution were planted in the mid 1930's when Bennett's, a Salt Lake City paint manufacturer, surveyed consumers and found a desire for a greater variety of colors than were being produced. When a way was found to produce colors arranged according to the theories of physicist Wilhelm Ostwald, package them in tubes separately from base paints, and adhere to rigid color standards with-

By
WALLACE G. BENNETT
Assistant to the General Manager
Bennett's
Salt Lake City, Utah

out compromise, the revolution was underway.

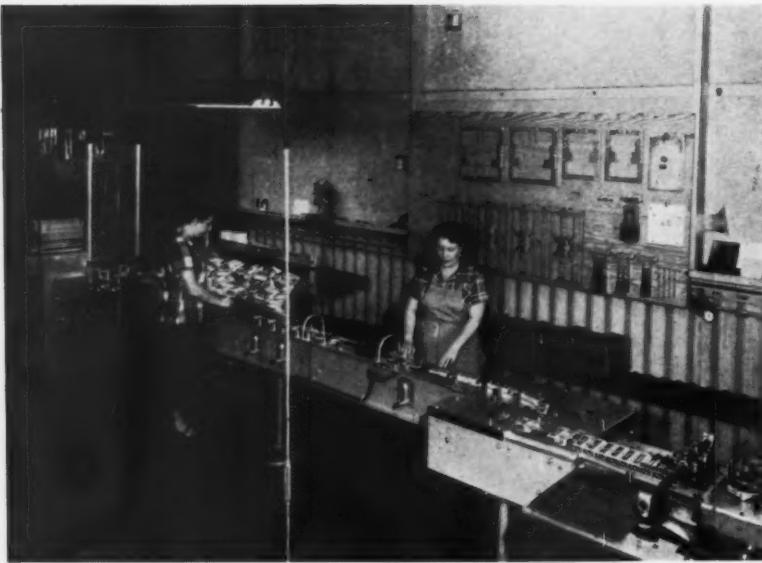
The "Colorizer" system produced, brought new life to Bennett's and its associates. It resulted in lower inventories and more satisfied customers for paint dealers. The resulting economies and growth in volume gave Colorizer Associates such an edge on the rest of the paint industry that larger manufacturers were forced to jump on the

bandwagon of increased color availability.

In the 1930's Bennett's was faced with mounting competition from larger paint manufacturers and suffering from the effects of the depression. The firm decided to conduct a survey to determine:

1. Who is our customer?
2. What does he or she want?
3. How can we best serve the customer?

This survey was conducted by actually asking customers buying paint these questions, as well as by house-to-house canvassing in areas adjacent to company-owned paint stores. Personal interviews with specific ques-



NEW semi-automatic cartoning equipment for the packaging of Colorizer colorants.

tions on materials, products, and color were conducted in Salt Lake City, Ogden, and Logan, Utah; Pocatello, Idaho Falls, Twin Falls, and Boise, Idaho.

Results showed that women do between 75-80% of the paint buying and they wanted "color" and not just good paint. Both at the time of the survey and since, Bennett's noticed increasing demand for colors not then available in paint lines. It was finally determined that a way must be found to supply women with the colors they needed to beautify their homes.

In 1937 Bennett's came out with their first "Colorizer" system. This was a tube system having about 54 colors. It worked on the premise that a given size tube of color would always be used in a given size can of paint. While the system was ahead of its time and enabled Bennett's to double the number of its dealer outlets, the company did not consider it good enough.

Ostwald's classification

About 1940 new studies were undertaken to provide a complete range of colors. These studies, which continued for several years, included an examination of the theories of physicist Wilhelm Ostwald. Ostwald's arrangement of colors, made in the late 1800's, became the basis of the color classification in the Colorizer system.

Ostwald took the strongest, cleanest colors obtainable under actual practical conditions and arranged twenty-four equally spaced steps in a circle. The hues in this circle were selected in such a way that opposites would be complementary.

Two cones are placed together. His 24 strong, bright colors are placed around the equator of the world formed by the two cones. White is at the north pole. Black is at the south pole. An axis running through the center of the world is made up of a value scale—steps of various mixtures of white and black which produce gray.

The majority of the colors lie within the world. Making two horizontal cross-cuts we see what the colors look like in the interior. Above the equator, where light gray has been added to the surface tint, slightly grayed color results. When the cross-cut occurs below the equator a darker gray is added, and a deep grayed color results.

The basic colorant colors for the "1322 system" were chosen by selecting every other one of Ostwald's 24 colors. These 12 colors are made up at the deepest strength possible in fluid tinting colors.

The colors in the Colorizer "1322 system" are placed at even intervals around a color circle. When one color is blended with its immediate neighbor, a new color half-way between is achieved. This new blended color becomes one of the colors of a new color circle created by similar blending of the other adjacent colors.

When Colorizer colors, once removed from each other, are blended, a third color circle is created. Essentially this progressive blending of the basic Colorizer colors is the genius of the Colorizer System. It accomplishes progressive graying of the colors that Ostwald found essential to orderly color classification.

In addition to the 12 "circle colors,"

the 1,322 colorants include four colorants to expand the system's coverage in the yellow, brown, and gray areas and a deeptone and a latex system. Deeptone colorants differ from the "1322 system" colorants in color strength, concentration, and in some instances in the color pigments used. The 11 Deeptone colorants are used in conjunction with the Colorizer Deeptone bases. There are 356 Deeptone colors in addition to the "1322 system." Manufacturing is so flexible that rubber latex paints could be added to the line with a range of 252 additional colors and addition of only three additional colorants.

Savings in the system

Paint manufacturers enjoy a lower cost of production coming from a high degree of specialization. Not having to provide ready-mixed paints, manufacturers in Colorizer Associates make the bases for the colorants—white, gray base, or deeptone base—and enjoy almost the position of "white line houses" in the industry.

Bennett's built a new factory shortly after World War II. The new plant with its improved layout, plus the advantages accruing directly from the production of Colorizer paints, caused an overall increase in the productivity of workers of 250% between 1936 and 1952. While wages have increased steadily, the labor cost per unit has decreased.

For the dealer, savings are in low inventory investment and minimum shelf space. In terms of physical units or in terms of the amount of shelf space these units of paint would occupy, the system permits a space saving of up to 75%.

Investment reduction for the dealer amounts to 50% or more.

An independent survey conducted by William H. Day, for his doctoral dissertation at Ohio State University in 1952, revealed that for ten leading paint companies the average number of colors offered was 226, with an average investment of \$1,161. The average investment per color is \$5.14. Therefore, to offer 1,322 colors would require an investment of \$6,795.08. Day feels Bennett's is conservative in claiming a reduction of investment of more than 50% inasmuch as a stock of 1,322 colors can be put in for a minimum of \$750.

Additional savings come to dealers who carried several lines to satisfy color demands of customers. One dealer who had carried several lines adopted the Colorizer System and found his other lines unnecessary. He reports "a more complete and balanced color assortment than the combined result of all lines carried previously."

Other dealer savings are in increased turnover and in the elimination of obsolescence.

Savings to the consumer come in being able to buy a complete selection of colors in all paint finishes at competitive prices, and in being able to match these colors perfectly every time.

Because Bennett's do not compromise on the color standards used, and because the color is held separate until time of use, perfect color rematching from one type paint to another, and one can size to another within the same product, is assured for the customer. Colors are immediately available without delay or waste often resulting from having to buy more than is needed, sometimes true of inter-mix systems.

Distribution

Marketing of Colorizer paints is international in scope. In this country 13 regional manufacturers have allied in a co-operative organization known as Colorizer Associates. Other members of the Colorizer Associates' group manufacture paint in Canada and Great Britain. There are presently upwards of 6,500 dealers distributing Colorizer paints.

Colorants distributed by members of the Association in the United States are manufactured by Bennett's. The Canadian and British associates have been licensed by Bennett's to manufacture their own colorants according to Bennett's standards. The international scope of the Association is rapidly increasing.

Members continue to manufacture their own base paints and retain complete identity, brand name rights, and individual services. Associates are long established and reputable firms in their own areas and are considered medium sized in the industry. Last year, the group came out with a uniformly made and labeled flat wall alkyd, its only common denominator in addition to the colorants.

Committees from among the Associates' group are constantly at work on technical, marketing, advertising, merchandising, and other matters. General meetings are held semi-annually.

Western Colorizer Associates are: Bennett's, Salt Lake City, Utah; Walter N. Boysen Co., Oakland and



DISPLAY COUNTER showing tubes and base paints necessary to give 1,322 colors.

Los Angeles, Calif.; and Kohler McLister Paint Co., Denver, Colo.

Manufacture

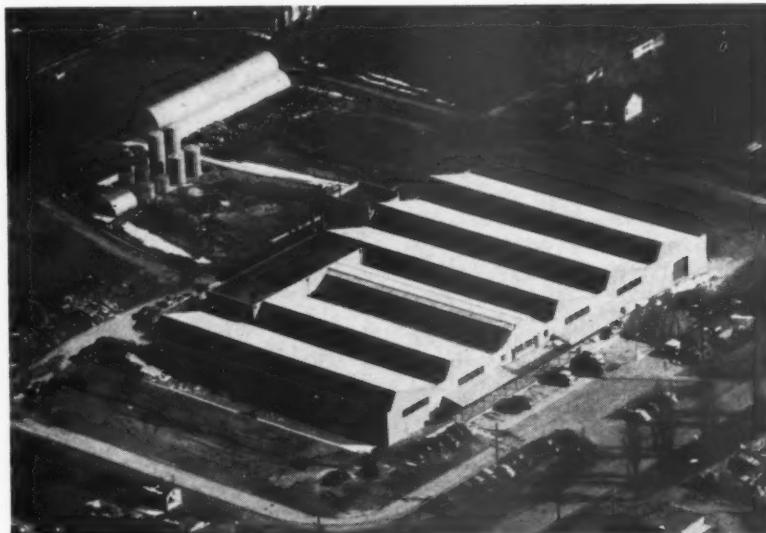
Manufacture of Colorizer colorants is a process similar to that of paint manufacture. Color pigments are combined with special vehicles and ground in paint mills. While most of the colorants are ground in ball mills, roller mills and kinetic dispersion mills are also used. After grinding, colorants are run through a series of exacting quality control checks and processes and brought to rigidly established standards.

One of the most important steps in the manufacturing process is standardization for color. Since factors involved in bringing a thousand-gallon batch of ready-mixed paint colors to an exacting standard are costly and time-consuming, many manufacturers qualify their standards with considerable tolerance. But because a thousand-gallon batch of colorant, when packaged, may serve to tint up to 50,000 gallons of finished paint, the cost involved in bringing colorant batches to an exact and rigid standard, when related to a finished gallon of paint, is relatively small.

Standardizer

The job classification of "standardizer" is a top rated one at Bennett's. The work requires both a good eye for color and working knowledge of mathematics. A near perfect score in the Inter-Society Color Council's color aptitude test is a qualification. A standardizer must not only match the colorant to a standard in "mass tone," he must also match a let-down standard tint for "tint-tone." Four expert approvals of matches to standard are required before a batch of colorant is released for packaging—the last being that of the Davis-Bruning Colorimeter, which reduces the matches seen by the human eye to mathematical equations.

The Bennett factory uses a cycle system of scheduling the manufacture of colorants which has resulted in a balanced inventory of both raw materials and finished goods. The cycle system also enables the other Associates to know at all times what colorants are coming off production lines.



AERIAL VIEW of Bennett's, Salt Lake City. An additional 9,000-ft. bay is being built.



THIS IS one of the jobs that investment bankers can handle.

Raising capital for your business

Logical financial sources for medium sized business

WHILE these remarks are meant to cover all types of organized business activity, they are particularly applicable to manufacturing enterprises. In order to establish a proper frame of reference it will also be necessary to define the term "medium-size business." Although this is admittedly arbitrary, we will assume that a concern falls under this classification if it fulfills at least the following requirements:

1. \$1,000,000 in annual sales
2. 50 employees
3. \$200,000 in net worth

It is still more difficult to set the upper size limits which will be just short of "big business," especially as to employment and net worth. Even with respect to sales, \$5,000,000 may be "big" in some lines while \$10,000,000 may be marginal in others. To pinpoint matters, we will say that a company whose sales exceed \$10,000,000 per annum is no longer "medium-size."

By
MARCO F.
HELLMAN
Senior Partner
J. Barth & Co.
San Francisco



Broadly speaking, capital requirements fall under three headings:

1. Temporary or seasonal
2. Semi-permanent or medium-term
3. Permanent or long term.

Excluding loans or investments by friends, relatives, or similar non-institutional sources, these needs are met in the following ways:

Temporary funds

Seasonal borrowings are generally arranged by the commercial banks who will lend on open line or on a se-

cured basis to help build up inventory, carry accounts receivable peaks, or meet other clearly temporary demands for funds. To preserve the requisite liquidity of their loan portfolios, commercial banks must insist upon early maturities — usually no longer than one year. Borrowers are expected to "get off the books" periodically if they expect to maintain a satisfactory credit standing and be accommodated regularly.

In recent years rapid growth has caused many medium-size companies to rely on temporary financing for some of their permanent capital requirements. This practice is not only frowned upon by the banks but it is extremely risky for the borrower, who sooner or later finds that credit policy changes in Washington or in his lending institution have put him in a precarious position.

Loss of liquidity at such a juncture deprives the debtor of his power to adjust himself quickly to changes in the economic climate and all too frequently results in the loss of the business itself. It is therefore customary for commercial bankers to recommend, and for their customers to accept, other forms of financing as a means of "cleaning up the balance sheet."

Semi-permanent funds

These are repayable over an intermediate term of no less than three to five years. The largest source of semi-permanent funds is private placement of notes or debentures, frequently in conjunction with some ownership interest. This placement is generally effected most expeditiously by investment bankers, especially where the amount exceeds \$100,000.

Semi-permanent financing is particularly inexpensive and appropriate for companies with a record of progress and profitability which is well above average. However, in an era of high corporate taxes it eventually becomes impossible to contemplate further expansion without additional permanent capital.

Long-term financing

Here we encounter bond or debenture issues with maturities of possibly ten years or more, as well as preferred and common stock. Unless a medium-size enterprise can show a record of sustained earning power—preferably five to ten years—it will have trouble raising money by means of long-term bonds or similar instruments alone.

With the proper operational history and a strong fixed assets position, it

may be possible for an investment banker to place a mortgage with an insurance company or similar institutional investor. Since interest charges are met out of pre-tax earnings, long-term loans are far less burdensome than preferred stock of the same amount and equivalent rate of return. On the other hand, loans must be repaid eventually, while preferred stock need not.

Whether to issue one type of security or another or a combination of both depends, among other things, upon conditions in the money markets at any given time. The entrepreneur will have to rely on the experience of the financier who must, of necessity, keep up with the never ending changes in demand for and supply of capital.

Investment banker's role

The big corporations have long been aware of the economic and financial counsel which investment bankers can supply; for this reason many of them are being asked to serve as directors. Medium-size organizations have been less prone to seek out such counsel, possibly because they doubt the availability and value of this service. However, in recent years the need for such professional advice has increased, thanks to the growing complexity of modern business problems. Investment bankers, by the very nature of their activities and the wide range of their contacts, acquire a broad grasp of the trends and issues which inevitably affect corporate policy.

Aside from guidance with respect to purely financial aspects of business, many investment firms are prepared to assist with basic corporate moves such as merger, sale of the business, or acquisition of other businesses.

Expansion is frequently better achieved through mergers or acquisitions which can rather quickly produce many competitive advantages. These benefits may relate to product diversification, cost reduction based upon the added volume, improved access to outside capital, and speedier entry into new or distant markets. Sale of an enterprise may be indicated if the owners have been unable to develop a "second team" to succeed them, or if considerations of health or estate taxes persuade the principals to seek greater liquidity for their holdings.

Investment banking houses which have been active in this field can help with the purchase or sale of a business in two ways:

First, they can provide anonymity for their clients and thus prevent premature disclosures which may cause

undesirable repercussions in the industry or trade involved, weaken employee morale, or undermine the principal's ability to bargain effectively.

Second, skilled intermediaries will act as catalysts to bring two or more parties together and to guide negotiations in a relatively disinterested manner. This professional approach is needed when it becomes necessary to appraise realistically going-concern values and tangible and intangible assets, and to work toward a meeting of minds. The ability of a respected third party to "trade" away extreme positions of the principals will often spell the difference between success and failure of a deal.

Selecting an investment banker

This task resembles that of choosing a medical specialist. A family normally expects a trusted general practitioner to take care of its sick. Quite often he will be able to diagnose a given ailment without presuming to cure it and, in that event, will call in a qualified specialist. In the medium-size business the function comparable to the general practitioner is frequently performed by the commercial banker or company attorney. When confronted with a corporate problem which goes beyond his scope of operation, such a valued adviser may well suggest the services of an investment banking house.

Once set up, the relationship between an investment firm and a corporate client becomes as privileged as between the latter and his commercial banker, attorney, or auditor. For this reason, confidential ties ought not to be established by chance or in haste while under pressure of a specific problem. Also, it should be remembered that some houses are geared primarily to serve the largest corporations, while other investment banking firms have traditionally worked with

smaller enterprises. Prior inquiry as to the background, reputation, and interests of any financial organization under consideration will prevent disappointment and embarrassment.

Western economic growth, notably during the last fifteen years, has led to the expansion of many concerns which had been in operation in the area for many years, and to the founding of numerous new organizations. More often than not this period was characterized by a seller's market in which the usual economic forces did not fully apply. Recently, we have witnessed the return of active competition which is already tending to separate the "wheat from the chaff." Even companies with a good line of products, strong regional acceptance, and adequate profit margins will find it rough going if caught with a ragged capital structure. New capital may be the only ingredient missing in this otherwise foolproof recipe for dynamic growth.

On the other hand, it is clear that a business devoid of outstanding products, adequate outlets, and above average earning power cannot be greatly improved through financial measures alone. It may therefore be necessary to strengthen management itself. In view of its widely-based corporate contacts, an investment banking firm can occasionally help even there.

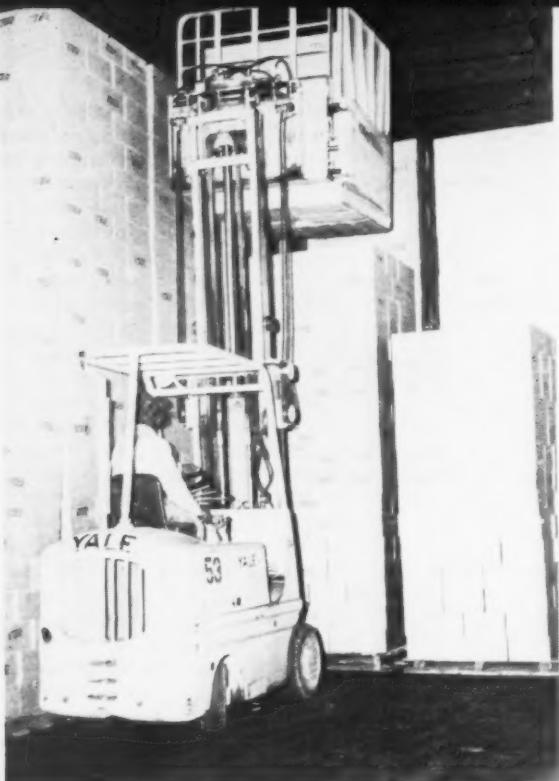
By and large, it is very seldom possible to raise sizable sums for the inventor who has an idea, a patent, or even a working model—but nothing else. Lacking assurance of a market, proper manufacturing and sales organization, and some history of prior achievement, the inventor cannot expect the financier to commit his own or his clients' funds at a stage when ultimate success is still so problematical.

Competent financial advisers, assuming an inherently promising situation, would tend to suggest a tie-up with an existing organization which appears qualified to develop the potentials of the product. Because going concerns frequently look for new products to add to their line, it may be possible to secure for the inventor-owner terms which would approximate conditions of full independence closely enough to satisfy him.

In brief, the investment banker's services, like those of the commercial banker, auditor, attorney, management engineer, public or labor relations counsel, and advertising agency, simply represent another "external" set of tools available to management for the advancement of the corporate fortunes.

The author . . .

Mr. Hellman is a director of Buffelen Manufacturing Co., Tacoma; Continental Air Lines, Denver; and Douglas Oil Co. and Monterey Oil Co., both in California. In addition, he is treasurer and director of the San Francisco Chamber of Commerce, a member of the Board of Governors of the San Francisco Stock Exchange (serving as its chairman in 1954), and has been a regional governor of the Association of Stock Exchange Firms since 1951.



AN Industrial Bear demonstrating palletless handling at Howard Terminal, Oakland.

Palletless handling

A 50,000 sq. ft. terminal saves \$15,000

HOWARD Terminal's new 50,000 sq. ft. East Oakland terminal has managed to save \$15,000 in pallet costs alone by transferring its goods from truck to warehouse to dockside with a lift truck unit that needs neither pallets nor slipsheets.

The Industrial Bear unit completely eliminates pallet boards in warehousing and transferring operations. Among the advantages of palletless handling are:

No sorting of pallet boards at 10¢ per ton labor cost.

No storage capacity taken up with empties.

No truck capacity taken up with returning empties.

Can handle bales, cases, drums, dried fruit bins, yet remain a regular fork truck when needed.

Further flexibility is provided in a side shifter allowing 10-in. movement laterally, and a rotator mechanism that can be added to dump loads.

This equipment will handle a wide range of commodities in many package shapes and sizes, from empty unlidded cans in bags to cartons of canned goods, green fruit lug boxes

(full or empty), dried fruit bins, drums, bales, coils, etc.—most of which is normal business for Howard Terminal.

Operation of the unit is simple. A group of centrally located control levers is manipulated to raise, lower, clamp, unclamp, and side-shift the load. Standard size pads are 48 x 60 in., lined with inexpensive sections of serrated rubber. Removal of pads is accomplished by extracting one pin for each pad. Different sized pads can be used for specific applications, or the bare arms can be used for such commodities as bales. Clamping arms can be removed in five minutes, changing the equipment back into a standard lift truck.

Reports indicate stacking to be a smooth operation resulting in even, stable piles, limited in height only by the type of commodity and the lift truck range. Operational savings resulting from use of this innovation are enough to buy several fork lift trucks. The Industrial Bear was developed by Howard Terminal and Industrial Truck Sales. The latter is a Yale & Towne distributor.

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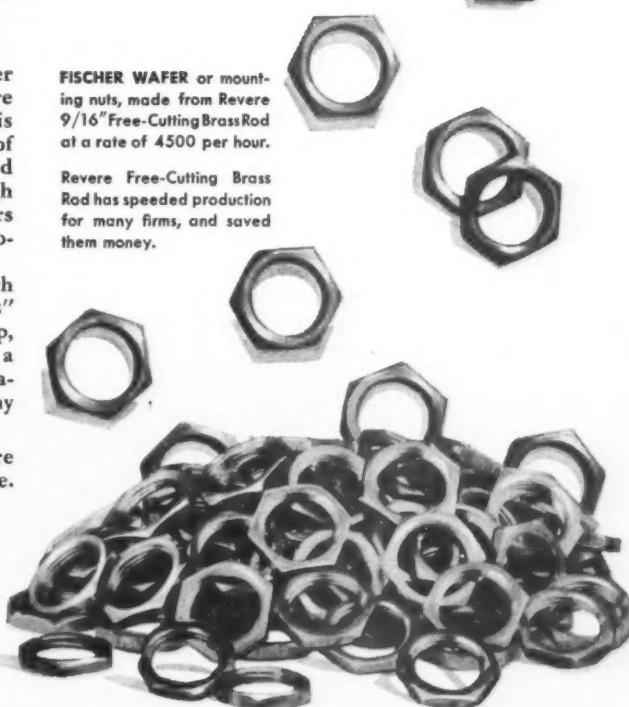
The mounting nuts shown here are made by the Fischer Special Mfg. Co., Cincinnati 6, Ohio, out of Revere 9/16" hexagon Free-Cutting Brass Rod. Output is 4500 per hour per machine. This phenomenal rate of production is due to special adaptations of standard machines according to Fischer designs and the high quality of Revere Rod. These two important factors enable Fischer to compete price-wise with nuts produced by other methods.

Fischer nuts are chamfered and countersunk on both sides, have no burrs, and are made in sizes from 1/8" to 1-1/16", in various designs, such as hexagon, cap, thumb, spark plug terminal, lighting fixture. As a further indication of the efficiency of the Fischer operation it can be reported that during 1953 the company averaged 244,897 pieces per running hour.

If you machine brass, look into the virtues of Revere Free-Cutting Brass. See the nearest Revere Sales Office.

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Let your Acme Idea Man show you the multiple advantages of Acme Steel Wire Stitching and Acme Steel Strapping as applied to your individual shipping and packaging problems. Call him, or write Acme Steel Company, Dept. HJ-15, 4903 Pacific Blvd., Los Angeles 58, California. Offices also located in San Francisco, Portland, and Seattle.

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March is a "Metals Month" for the West this year

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Mountain (Bendix)
Coordination

THE West will be getting the full treatment in the metals and metalworking fields from March 14 to April 1, when the American Society of Tool Engineers and the American Society for Metals and allied groups put on their conferences and shows in Los Angeles.

First on the program is the ASTE, with its first ASTE Western Industrial Exposition in Shrine Auditorium, where daytime technical sessions also will be held. Evenings will be at the Ambassador Hotel.

Co-sponsors for two morning sessions will be the Southern California Section, Society of Plastics Engineers, and the American Society for Quality Control, March 15 and 18 respectively.

General topics for the five days are: *Monday March 14*: professional developments; *March 15*: pressworking; *March 16*: management; *March 17*: processes; *March 18*: precision control.

Twenty-four technical societies are cooperating with ASM in its Ninth Western Metal Congress and Exposition, March 28-April 1. The latter will be at the Pan-Pacific Auditorium, largest exposition structure west of Chicago, and the meetings at the Ambassador Hotel.

Session topics and dates are as follows: *Monday, March 28*: morning, dye materials and new forming methods; afternoon, titanium. *March 29*: morning, new metals in the petroleum industry; afternoon, high strength steels. *March 30*: morning, heat treating of titanium, magnesium, and aluminum; afternoon, powder metallurgy. *March 31*: morning, atmosphere furnaces, salt baths, induction heating, and heating for forging; afternoon, metals for the electronics industry.

The two morning sessions on heat treating will be ASM sponsored, but presented by the Industrial Heating Equipment Assoc.

In addition to ASM and IHEA, the American Welding Society, Society for Non-Destructive Testing, and the Los Angeles chapter of the American Foundrymen's Society will hold sessions at the Metal Congress.

William H. Eisenman, national secretary of the American Society for Metals, feels that the 1953 attendance figures of 53,433 turnstile count and registration of 32,395 will be exceeded.

In between the two shows and conferences there will be a two-day regional conference of California chapters of the American Foundrymen's Society at the Hotel Huntington, Pasadena.

Lists of exhibitors and their booth numbers at each show are given in this issue, beginning on page 68.



AWS speakers: Tiner (North American); Russell (Airline Welding). Los Angeles chapter officers: Smith (Douglas, Long Beach); Lanier (Southwest Welding).

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CAREFUL HANDLING at Enterprise Engine, San Francisco. Tool crib foreman Henry Rody shows how. Shelves are lined with plywood.

PROFITS are made or lost in many places and not the least of these is in tools and the tool room. It is one spot in which any degree of guesswork can destroy all estimating and production techniques elsewhere in the shop.

Usually major shops or plants have had this so forcefully demonstrated in the past that adequate safeguards have been established. In many smaller shops the reverse is true. Dollars disappear from the profit ledger under the very eyes of those seeking to safeguard them the most.

One of the greatest leaks in smaller shops is in failure to provide adequate protection for tools. Cutting edges have far too little protection from damage, and whenever or wherever this happens costs mount and mount.

Cutting edges determine the efficiency of any machine tool and can also have a great deal to do with adequate control of shop costs in actual production. Sharp tools with proper cutting and clearance angles give us maximum results in machining, keep up continued flow of production, reduce rejects, and provide more return on the payroll investment in the shop.

This is one of the greatest profit leaks in smaller shops where little time is available for study of such cost factors and where cutting tools are usually pressed to the limit before being repaired. In many instances it will actually pay a shop to take time out regularly for a close check of such tool edges. Certainly it will pay to run such checks each time any tool of this nature is returned to the tool crib.

Each cutting tool has a point of

A tool saved is a tool earned

maximum efficiency, and when it begins to dull by the slightest degree, that efficiency commences a rapid decline and starts to waste production dollars. It seldom pays to push the use of any such cutting tool past that point of diminishing efficiency, no matter how rushed the production schedule may be.

The widespread use of metal shelves and racks has accelerated such losses through dulled cutting edges. This has been particularly true during rush periods when employees not acquainted with the importance of protecting every single cutting edge become careless in their handling in such storage. Many dollars have gone out the window through such carelessness.

Wood protects edges

Wood still provides the best protection of such edges. Rough plywood has become so inexpensive that it is being used extensively as a shelf lining or for inner lining on racks or boxes in which cutting tools are stored. In some instances cork is also used. In either case the inexpensive installation of such protection wherever cutting edges are stored will save many dollars in even a single month's time.

There is also greater need for more attention to elimination of dirt and dust in storage. The inexperienced employee feels that a unit as rugged as a cutting tool could hardly be affected by dust or dirt. Such individuals can well be shown an edge exposed to dirt and dust under the microscope.

Many makeshift cleaning methods fail to adequately provide protection

of edges; they simply move hard particles of dirt or dust around the store-room. An investment in a rebuilt vacuum cleaner will more than repay itself in edges saved and reduction of sharpening costs in even the smallest shop toolroom.

Many small shops have found that it pays to mount tool storage racks on casters so that they can be moved to different areas for cleaning and thus avoid the spreading of dust from one set of fixed shelves to another. This is another simple remedy.

Improper storage of individual tools also adds to the excessive cost picture. Each and every type of tool has a proper method of storage to prolong its useful life and accuracy. If no experienced individual is on the shop staff, the office can well write the manufacturer of each tool in the store-room for advice on how it should be stored. Micrometers, for example, will have a tendency to distortion when laid flat on their sides. Each such tool in the shop can have its continued accuracy and useful life prolonged by making certain that it is stored properly in the toolroom.

Records a "must"

Adequate records are also of importance. Too often the small shop management considers its tool investment insufficient to justify an elaborate record keeping system. Such an opinion is quickly changed when investment therein is checked closely, when that investment is studied in the light of yearly costs or in the useful life of such tools as now obtained in

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the shop and in comparison with those of shops where close attention has been paid to such a system.

In many cases it has been found that an extra year of useful life can be obtained from almost every tool in the crib through systematic records on tool use, which give a ready check to their maintenance and almost completely eliminate stolen or misplaced tools.

Such a record provides needed control for both tools purchased from outside sources and those made in the shop. These records not only give estimators much more accurate records with which to work in figuring tool costs on any project, but also keep shop foremen well aware of tool costs. That alone provides reduction in damage in use and while outside of the crib, through closer control by foremen who have been made aware of the dollars-and-cents value of even the smallest tool.

Salvage methods

Attention should also be paid to possible salvage of broken or worn tools. The shop which requires that all broken or worn tools be turned in on record forms at a given time each week or month has another good cost record in the files and much better chance of profit saving through early salvage or repair of such tools.

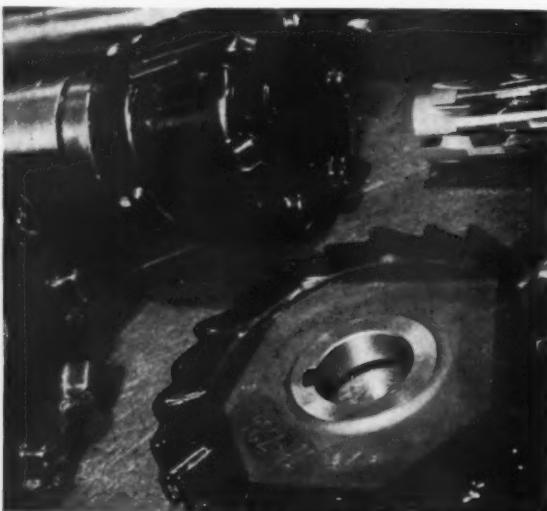
It is also profitable procedure to pay attention to tool turnover, and particularly to keep adequate records which will spot such movement without a diligent search to obtain the figures. If such data are constantly available and up to date, we may be assured of much closer control than if data must be extracted from a number of records or even by physical in-



ENTERPRISE covers reamers and other tools with "Dip-Seal" plastic when necessary. Tools protected like this are not so likely to suffer damage if dropped.

ventory. Human nature being what it is, the latter method will find itself used far too infrequently in any shop.

Adequate knowledge of tool turnover, kept up to date at all times, can provide much closer cost control. And it can also provide shifts in layout of tool bins which will give greater efficiency and speed in their use by spotting frequency of turnover immediately as production needs shift from week to week. Thus tools currently in greatest demand can be kept up front and time needed in handling them reduced considerably.



SPECIAL-SIZE reamers are reground after each job, then dipped.

SHELL MOLDING Fundamental research begun

FUNDAMENTAL research on shell molding, the revolutionary new process for casting metal developed in Germany and brought to this country after the war, has been begun in the metallurgical section of the Division of Industrial Research, Washington State Institute of Technology, Pullman, Wash. In charge of the project is Dr. William F. Zelezny, metallurgist for the division. Alfred G. Biggs, of the mechanical engineering department of the College of Engineering, is working with Dr. Zelezny.

Dr. Zelezny will make a more comprehensive survey than has yet been undertaken of the effects of several variables on the properties of shell molds. The variables to be investigated will include the shape and size of sand particles, the size distribution of the particles, types of resin, per cent of resin, and the mold release agent. The effects of these variables on tensile strength and transverse strength of the mold, permeability of the mold, gas evolution from the mold at casting temperatures, and surface finish of the mold will be studied. Finished plastic body for the 5-ft. sports car weighs 14½ lb.

LOW TOOLING COSTS, SPEED from vacuum forming

K-PLASTIX CO. in San Francisco recently completed an order of midget plastic cars, turned out on a very limited time schedule. This fabricator decided that it was less expensive and faster to vacuum-form a large number of models from high impact strength rigid vinyl than to use a polyester plastic and the lay-up method. Low tooling costs and simple fabrication methods justified the selection of this material. Since the vinyl is a thermoplastic material, the model cars can be easily repaired by welding with a hot gun if they should become damaged.

The pre-cut rigid vinyl plastic sheet is clamped in a frame, heated for 8 min. in a forced air oven at 310 deg. F., and then placed in a die and deep-drawn. A bank of infra-red lamps is used to spot heat under-cut sections; when these sections are pliable they are sucked in through vacuum holes in the die and then air cooled.

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BOOTH 364—Western Metal Exposition

Pan-Pacific Auditorium

March 28, 29, 30, 31—April 1

Die casting for machine tooling

Result: lighter weight, reduced production and assembly costs

By DAVID LAINE
Executive Secretary
American Die Casting Institute

DESIGN change-over to die cast components in new models of industrial and home machine tools is resulting in lighter weight and reduced production and assembly costs, because of the one-piece construction inherent in the die casting process.

Streamlined functional parts made of certified zinc or aluminum die castings meet the machine tool industry's rigid requirements of impact resistance, close tolerances, and attractive appearance.

In the manufacture of power tools for the home workshop, a unique design problem develops. Although industrial tools must meet critical specifications to maintain a heavy work schedule, these machines have the advantages of trained skillful operators and a sustained maintenance program. On the other hand, the "do-it-yourself" workshop operator—semi-skilled or unskilled—may ignore preventive maintenance of a machine—with the possible exception of an occasional oiling—and subject it to many unpredictable abuses. Thus, the home tool must be designed with ruggedness equal to the industrial unit.

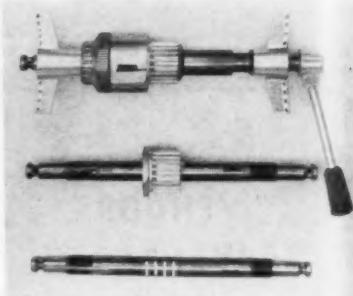
To meet these needs, more and more designers are specifying die castings, both certified zinc and aluminum, according to the American Die Casting Institute, national association of job shop die casters. Die casting permits designers to develop close-tolerance complex parts—often involving intricate undercuts, cored holes, and curved sections—at low unit cost. High impact and tensile strength, dimensional stability, elimination of machining, and smooth surface finish are essential characteristics of the die casting process.

Improvements

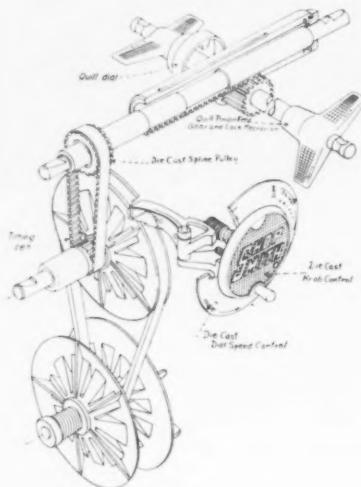
How die castings improve the construction and operation of home and industrial machine tools is illustrated in the following example.

Representing a problem in designing for multi-function use, the Shopsmith incorporates a table saw, lathe,

disc sander, horizontal and vertical drill presses, in one compact unit. Recently redesigned to modernize its appearance and increase its ease and safety of operation, Magna Engineering Corp.'s (Menlo Park, Calif.) new model is shown as the Shopsmith Mark 5. Ingenious design by Magna engineers combines components made from stampings, powder metal, nylon, permanent mold castings, and die castings.



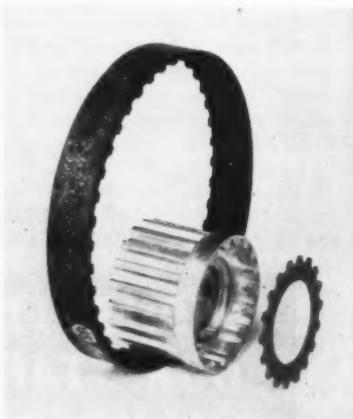
ZINC GEARS die cast around steel shafts.



SCHEMATIC drawing shows location and function of die cast components of Shopsmith Mark V.

Unique from an operation as well as a production viewpoint, the quill pinion feed gear and lock move the quill and lock it in any desired position. Thus, the die cast zinc gear must be attached to its shaft in such a manner that it can resist the torsion of quill operation and axial displacement required to clamp the gears which lock the quill.

The zinc gear, 1 9/16 in. long and 2 1/8 in. OD, is die cast around a 3/4 in. diameter steel shaft 12 in. long, previously milled where the gear is to be cast. This provides a better bond between the casting and shaft, to resist the forces of torsion and thrust. Thus the steel shaft, the main core of the quill assembly, becomes an insert for a much smaller die casting.



THIS ZINC spline pulley can hit 5,200 rpm.

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a relatively low cost. Additional parts of the quill feed, such as the knob control and the dial speed control, are die cast of aluminum.

Because of die casting's advantages, Magna engineers also redesigned the spline pulley, part of the Shopsmith's drive mechanism. Formerly a powder metal part, this pulley is now a certified zinc die casting. Basically a gear within a gear, both gear portions are cast with a minimum total draft of 0.004 in., and both must be concentric so that their centers are not more than 0.006 in. apart.

In operation, the external gear of the spline pulley engages a Gilmer belt and the internal spline of the same pulley accepts a set of friction plates which are stampings. Here again, die casting's ability to maintain close tolerances and produce a smooth surface finish permits this pulley to run as high as 5,200 rpm. without belt damage.

The redesigned Shopsmith Mark 5 is more efficient than its predecessors, much safer and easier for the operator, and more attractive because of modern "clean" design. To the "do-it-yourself" craftsman, it represents a saving.

TOOLING ON CENTERS Used by surprisingly few small shops

TOOLING on centers is used by surprisingly few small shops today, although it has outstanding advantages and has been employed by the automobile industry for years, according to John N. Gladden of Gladden Products Corp. of Glendale, Calif.

In the Gladden plant, practically every casting or forging is tooled in this manner.

The first or centering operation consists in locating the raw part in a carefully designed jig and drilling the three or sometimes four centers to an accurate depth. Usually the jig is so designed that some part of the drill spindle stops on the jig itself. Depth is checked with a flush pin gage. From here on, every operation is tooled from the center points.

"You don't care whether the casting is warped, has letters or even warts on it," says Mr. Gladden. "Your entire accuracy is held by the centers. Indeed, where accuracy is concerned, this method of tooling is hard to match."

"Early in the game we had an experience that served to clinch this conclusion. We had a hydraulic body requiring a blind bore 1 1/8 in. in diameter with .002 tolerance and 4 1/2 in. deep. A surface finish of 10 Micro was required.

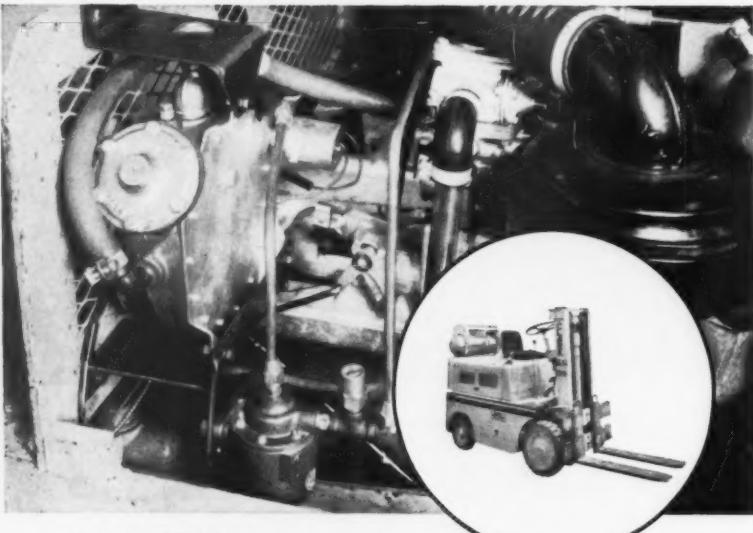
"By some carelessness, a night operator ran 235 of these bores 1/16 in. too shallow. You can imagine the consternation next morning. With nothing to lose, we put the parts back in the jig and ran the boring bar in to the correct depth without scrapping a single part—we were sold! What other method of tooling will repeat this accuracy?"

Since a center point is self-locking in effect, the problem of holding the part rigidly during machining is very simple. The Gladden people use only hand knobs for tightening the part; in fact, only finger pressure is required to hold the part and use of a wrench adds nothing.

This has simplified the operator problem. Since no great force is required, women, older men, or handicapped people can load and unload the jig or fixture. The operator needs only to be able to hit the two fixed centers and then get the third center in the little hole, and a minimum of intelligence and dexterity is required.

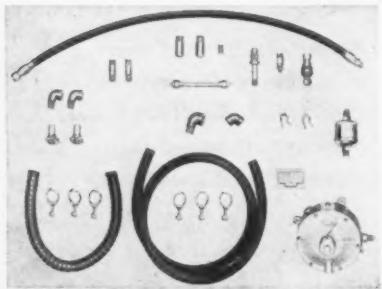
As the centers and the center points offer very little area on which to collect chips, dirt, etc., mislocation for this reason is quite unlikely.

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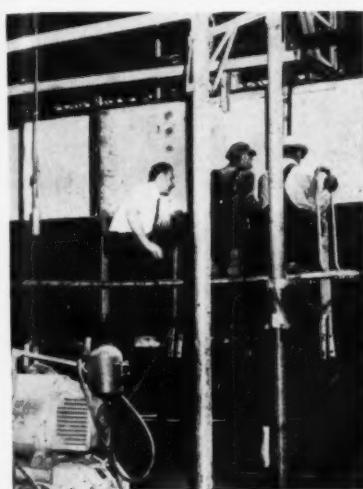
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THIS 10-ft.-long stainless steel sheet is pre-punched to fix the location of studs.

THROUGH an unusual application of plug welding, probably the first of its kind, the Southern Pacific Co. recently expedited the application of steel sheets on both sides of a passenger car at its Sacramento shop. This fastening job came along in connection with converting an observation car which had been stripped to the bare framework into a new dome lounge passenger car.

10-ft. steel sheets

Three horizontal courses of 10 ft. long steel sheets, $3/32$ in. thick, were secured to the sides of the car. The lower and top rows, 4 ft. and $1\frac{1}{2}$ ft. wide, respectively, were of a low-alloy, high strength, corrosion-resistant steel, while the 4 ft. wide center row was smooth stainless steel.

Later, corrugated stainless was secured to the lower and top rows. Channel members to which the sheets were plug welded were $1/8$ in. thick low-alloy steel, from 18 to 24 in. apart.

Prepunching

Before plug welding, the sheets were prepunched to fix the location of the studs on the framing members. Framing members meanwhile were cleaned of all paint with a sanding disc. A tack weld, to hold the sheets in position until plug welding was completed, was then made from the top edge of each sheet to a channel member.

Plug welding with a stud welding gun was performed vertically, using mild steel studs for fastening the low-alloy sheets and stainless steel studs

Plug welding speeds up steel sheet work



PLUG WELDING of steel sheets to form the sides of a Southern Pacific dome lounge passenger car was facilitated by a sliding block of wood behind the stud welding gun.

for the stainless sheets. Two stud welding guns were used on the job, and a total of 6,000 studs, $3/8$ in. in diameter, were plug welded.

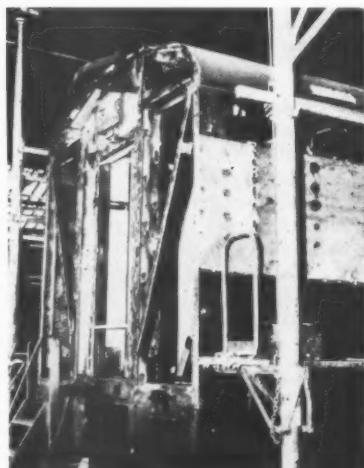
Wooden guide block

An ingenious device was used to hold the sheets tight against the frame members—an essential condition for good plug welding. An 8-ft. section of 1-in. pipe was fitted with a hook at the top and a sliding block of wood. The pipe was suspended vertically from horizontal frame members by the hook, and the wooden block was moved along the pipe to positions close to the plug welds, where it was pushed against the sheets.

After the sheets were fastened, protruding ends of studs were pinched off with pliers. An emery disc was used on the stainless steel to remove excess material and to leave a polished appearance. The small spaces between butted sheets were filled with manual welding.

Proven successful

Over-all results on the job were considered successful by Southern Pacific officials and they are planning to use the same procedure for building six more dome lounge cars. There was no warpage in either the sheets or frame members. The job was engineered by Southern Pacific car designing engineers.



UPPER (lighter) sheet is stud welded stainless while the lower (dark) is low-alloy steel.

Super alloys



ALLOY B is deposited on the seating surface by Unionmelt welding.

By F. S. BOERICKE

District Manager
Haynes Stellite Co.
Los Angeles

THE use of durable cobalt and nickel-base alloys, commonly known as "super-alloys," has shown remarkable growth in the West during the past decade.

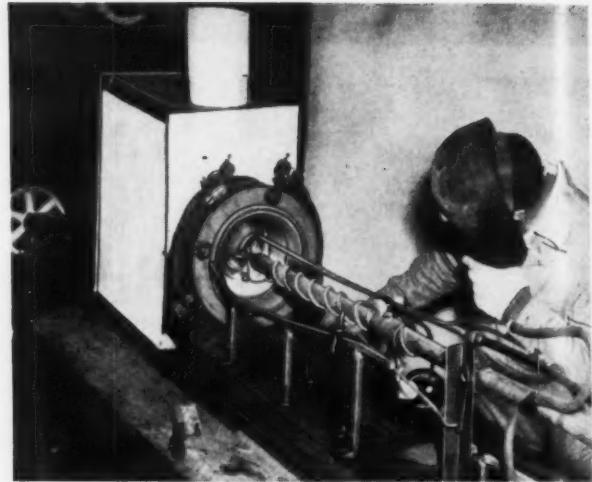
A little over ten years ago Haynes Stellite Co., the major producer of special alloys, maintained little more than a skeleton service force in the Western states. This was primarily to serve the needs of the aircraft industry for high-temperature alloy parts such as combustion chamber liners, tail pipes, diffuser rings, tail cones, and afterburners.

Nowadays, however, the company is looking Westward for some of its major markets. One of the most significant aspects of the growth has been

the increased use of alloys in the field of industrial maintenance.

This field may be less glamorous than the aircraft industry applications, but it represents an enormous potential. The same alloys that helped push jets through and beyond the sound barrier are turning up more and more in such places as refinery valves, steel pickling tanks, forging hammers, electrostatic precipitators, and ore-processing equipment.

Practically the same methods of mechanized welding that were developed for high-production aircraft work are now being used to deposit corrosion- or wear-resistant layers of alloy on anything from refinery valves to forging die pots. The same techniques that were used to form and weld tailpipes and afterburners are being used in producing furnace liners and heat-treating containers.



A HARD-FACING machine makes a uniform deposit on forging die pots.

climb into overalls

Developments in investment casting of high-temperature alloys for intricate airfoil work are now being applied to reduce production costs and future maintenance of industrial turbines ranging in size from 35 hp. up to those developing 175 horsepower. Investment castings are also being used to advantage in the food, agriculture, machinery, and steel industries.

A San Francisco Bay Area forging plant has increased the life of die pots by three times by hard-facing with Hastelloy alloy C, a nickel-base alloy. An unusual setup is used to hard-face the pots mechanically. It is built around Linde's sigma welding process and uses coils of bare alloy wire to do the job.

Besides the savings from increased die life, it has been found that the average press tonnage needed for the



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Then talk to the Chase experts at the exhibit. They'll be glad to fill you in on all the new developments in the brass and copper industry.

This exhibit recently won the "most informative" award at the National Association of Purchasing Agents Convention and Inform-A-Show in Chicago. **Don't miss it!**

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slugging and piercing operation is reduced by 30%. In some instances, press tonnage has been reduced by some 50%.

Before being faced, the pots are pre-heated to 350 to 400 deg. F. An SAE 2340 steel forging is used as the base metal. An interesting sidelight of this application is that the material costs for the forging and the Hastelloy alloy C wire to do the job are about one-half as much as formerly.

Another nickel-base alloy, Hastelloy alloy B, has produced comparable savings in installations in the petro-

leum industry. Four years ago, a large oil refinery in the Southwest installed four through-conduit gate valves in a flue-gas line of a hydroformer unit. The seats, and the seating surfaces of the gates, were protected by a coating of Hastelloy alloy B. The flue gas, which contained sulphur, passed through the valves at 800 deg. F., under a pressure of 300 psi. Despite these severe operating conditions, a recent check showed that the valves are still in good shape and all four seating surfaces on each valve are in perfect condition.

Hastelloy alloy B rod, $\frac{1}{8}$ in. in diameter, supplied in coil form, is applied to the seats and the seating surfaces of the gate assembly by the Unionmelt welding process. The deposit is finished to a depth of $\frac{1}{8}$ in., and is 1 in. wide. Four pounds of rod will protect the seating surface of a gate for a 20-in. valve. The deposit is made in 20 minutes.

Haynes 90 tube rod and a specially designed Unionmelt head were recently teamed up to do a job that would have been difficult, if not impossible, to do manually. The new rod is being used to hard-face the inside of pipes that are only 10 to 14 in. in diameter and up to 10 ft. long. The pipes are hard-surfaced to protect them from the abrasive action of carbon-covered catalyst in the cracking unit of a large oil refinery.

The hard-facing machine is mounted on an 11-ft. boom and the No. 90 rod is fed into the head by an air motor. Before hard-facing, a 6-in. length of pipe is welded to both ends of the tubes to serve as a start and runout tab for each bead. The 3/16-in. diameter rod is deposited using about 27 volts and 425 amps.

Beads laid longitudinally

The beads are laid longitudinally rather than in a spiral on the inside of the tubes. In this way, any irregularities will be oriented in the direction of the gas flow. This cuts down on turbulence. A slight gap is left between the adjacent beads. These gaps are filled in on a second run of the hard-facing machine. The workpiece moves past the welding head at a rate of about 18 in. per minute.

A vibrating conveyor chute made of Hastelloy alloy C plate has already had six months' steady service under severe conditions, and is expected to last for at least another six months. Chutes previously used were repaired or replaced about every four months. The conveyor is in use at the plant of a Los Angeles rivet manufacturer.

Rivets are loaded at one end and conveyed into a continuous heat-treating furnace by the vibrating chute. The temperature along the conveyor varies from room temperature up to 1,600 deg. F. The chute, which spans the furnace entrance, is subjected to severe oxidizing conditions even though there is a flame curtain and the furnace has an inert atmosphere. Materials previously used would be loaded with scale in less than four months.

If the heat-treating operation is to be successful, the rivets must lie flat as they move along the chute. When

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chutes formerly used began to scale. The rivets would bunch up in piles. The result was that some of the rivets were not heated properly.

Scaling has been eliminated by the use of the alloy C chute. There has been no oxidation serious enough to retard the flow of rivets. The chute was made of $\frac{1}{4}$ -in. plate. It is about 17 in. wide and 3 ft. long.

Shown on this page are two heat-treating cans that were used in the same service—pack carburizing and pack annealing metal parts. In operation, they were exposed to temperatures as high as 1,300 deg. F. The steel

can (left) lasted only 20 hours in this service. The can (right) made from Multimet alloy—a nickel, cobalt, iron alloy—has been used for 2½ years.

Super alloys are also doing a job in handling corrosive chemicals in the metal-working and mining industries. For instance, four years after their original installation, some Hastelloy alloy C paddles have given 16 times the life of materials previously used in a pickling installation and are still going strong.

The paddles are part of a mechanized setup in the production of tubing for electrical conduits by a California



TWO heat-treating cans used in pack carburizing and pack annealing metal parts. Left can is steel, that on right Multimet alloy.

company. At this company, tubing is formed from SAE 1010 steel strip by electric resistance welding. The tubes are straightened, chamfered, and then pass through a 335-ft. automatic electro-galvanizing unit. This unit cleans, pickles, zinc-plates the outside of the tubing, and then enamels the inside.

Three pairs of Hastelloy alloy C paddle wheels carry the tubing through the pickling bath, which is 10% sulphuric acid heated to 165 to 170 deg. F. The paddles rotate in the acid. They pick up the tubing and immerse it in the liquid, tilting it back and forth so that the inside is thoroughly pickled. The main complications from an equipment standpoint in this operation are the severe aeration, which accelerates corrosion rates, and the hammering on the paddles.

Fifteen of these original paddles have been in service now for four years. Over three years ago, 75 more alloy paddles were added to make a complete set. Two years ago, alloy C runners were installed. Hastelloy alloy C hubs and flanges have been in use over a year. All of these parts are still in service.

The nation's largest uranium ore-refining mill at Uravan, Colo., extracts both vanadium and uranium from the carnotite ores found in the Colorado Plateau. Equipment used in roasting and leaching the ore, to obtain the two valuable metals, is subjected to severe corrosive conditions. In order to extend the life of parts at many of the corrosion trouble spots, Hastelloy alloy is being used at this mill, as well as in a similar mill at Rifle, Colo. In many instances, the Hastelloy alloy parts are giving months of service, where others failed after just a few days.

Hastelloy alloy C spray nozzles and piping are being used in scrubber towers to handle a corrosive acid solution. The acid solution is sprayed into hot roaster gases containing abrasive dust, hydrochloric acid, and chlorine



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gas at about 660 deg. F. In this same service, materials previously used had to be replaced in from three days' to three months' time. The Hastelloy alloy parts, however, have been found to be still good after 14 months' service.

In the same setup, an alloy C pump impeller has been used to provide pressure for the spray solution for three years. The housing for the pump, which is also made of Hastelloy alloy C, lasts a year. Pumps formerly handling the acid had to be replaced every three weeks.

The ore leaching solution is heated in a Hastelloy alloy heat exchanger. This unit, which conducts live steam, is immersed in the acid. The presence of various metallic ions in the solution, which is largely sulphuric acid, tends to accelerate corrosion rates.

In this application, special steel piping lasted only a few days. Piping with organic coatings lasted about three months, but once the coating cracked, the steel shell beneath it was corroded away inside of a day. Hastelloy alloy C exchangers give an average of eight months' service before re-

quiring replacement, it is found.

Several West Coast manufacturers are using electrostatic precipitators to remove corrosive liquid and solid particles from various industrial process gases. Recent tests have shown that these installations require less maintenance and actually give better performance, now that Hastelloy alloy C wire is being used for electrodes.

This nickel-base material is not affected by the corrosive agents involved in this service and has superior mechanical strength (130,000 psi). This combination of properties makes it possible to use electrodes that are only 0.073 in. in diameter. The effective diameter of the lead covered wire formerly used was more than 0.500 inch. The smaller cross section of the Hastelloy alloy electrodes increases the efficiency of the unit because it permits the use of higher voltages with a more uniform corona pattern.

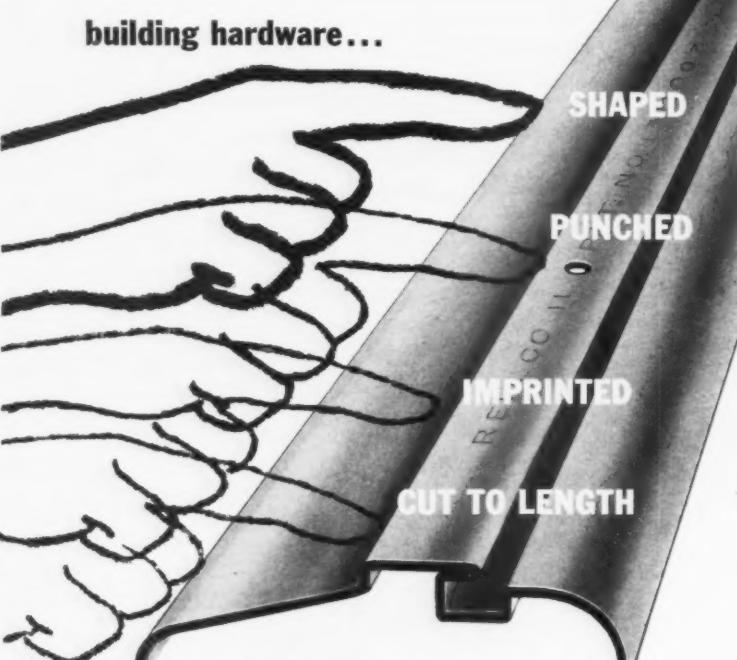
Hastelloy alloy C electrodes have been installed in mist precipitators where hydrochloric, sulphuric, sulphurous, and mixed acids were present. A check on an installation in an acid plant showed that the Hastelloy alloy C wires experienced no weight loss after a year's operation. Lead-covered steel wire lasted an average of eleven months with electrode failure weekly.

A future era of more efficient transportation may result from the tests recently completed on a small, lightweight gas turbine engine. The engine, a 200-lb. 175-hp. unit is being produced by Boeing Airplane Co., Seattle, for the U.S. Navy. The heart of the engine is made up of two turbine wheels, each equipped with blades precision-cast of Haynes Stellite cobalt-base alloy.

Known as the Boeing Model 502, the turbine consists of two main components, a gas producer section and a power output section. These are distinct units. No mechanical connection, gear or shaft, exists between them.

The gas producer section consists essentially of a single-stage mixed flow compressor, and a single-stage axial flow turbine wheel mounted on a common shaft. Air passes through the compressor to the combustion chambers where it is heated. The hot gas is then directed to the turbine wheel through a nozzle box. The hot gas (1,500 deg. F.) impinges on the investment-cast blades and spins the turbine wheel at a rate of 36,000 rpm. This stage provides the power to drive the compressor and run the fuel pump and other auxiliary equipment.

The exhaust from the gas producer section also provides the energy for



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turning the turbine wheel in the second component, or power output stage. The exhaust gas, now at a temperature of approximately 1,300 deg. F., turns the second turbine wheel at approximately 25,000 rpm. This wheel supplies the power to an output shaft through a double step reduction gear set-up.

Haynes Stellite alloy was selected for the turbine wheel blades because of the high operating temperatures involved, 1,300 to 1,500 deg. F., and because they are strong enough to withstand the terrific centrifugal pull created when the wheels whirl at 36,000 rpm. The clearance between the tips of the blades and the surrounding shroud has to be close to 0.015 of an inch for efficient operation. The investment-cast Haynes Stellite blades have the dimensional stability to remain within this limit.

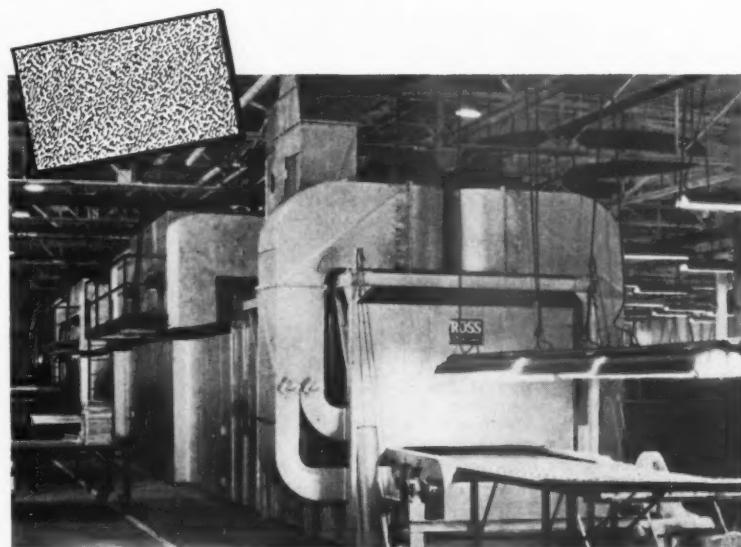
More than one company uses investment casting as a production tool for high-temperature turbine wheels. An integrally cast turbine wheel is now being produced at another company at 74% less cost than by former methods. The wheel was at first produced as a pancake forging, weighing 20 lb. It was machined to a final weight of about 11/4 lb. Now that the part is produced as an investment casting, only 2 oz. of metal has to be removed to bring the part to final dimensions. Besides decreasing machining time, investment casting helps save 18 lb. of valuable metal per wheel.

The wheel, which is made of Hastelloy alloy B, is used on a small gas-turbine motor produced by AiResearch Manufacturing Co. in Los Angeles. These inward-flow radial turbines are used to drive air compressors or electric generators for auxiliary power in aircraft.

Hastelloy alloy B was selected for this application because of the 1,600 deg. F. operating temperature and the large stresses induced in the wheel at 40,000 rpm. Investment casting has been established as the most economical means of producing the wheel.

In addition to all of these applications, the aircraft industry is by no means standing still in dreaming up new and improved uses for alloys. Some very interesting developments are now underway in rockets and ram jet engines that cannot be discussed here. Perhaps these developments may someday change our entire present concept of limits for temperatures and stresses in industrial equipment, and of the corrosive activity of materials that can be handled by chemical equipment. The trend has already started.

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ABOUT TURKEY ... AND TEXAS

In our World Book Encyclopedia (which incidentally, is a "must" if you have school kids in your family) Vol. 16, page 8215 under the "T's" Turkey is compared with Texas.



V. J. Fawcett

Turkey is somewhat larger than Texas with an area of 296,107 square miles. Texas has an area of 267,339 square miles.

E. W. (Bill) Van Ness, contract administrator for The Ralph M. Parsons Company, on a recent trip to Ankara was much too busy with executive matters to give us a report on the weather, but we gather from our text that Turkey and Texas have somewhat similar climatic characteristics . . . moist, sub-tropical along the coastal areas . . . hot and dry inland.

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existing facilities and the addition of facilities in many areas.

Several years ago the ASM faced this problem and accepted its challenge. Since that time, the ASM Foundation for Education and Research was established. An annual award for teaching of metallurgy as well as a graduate fellowship in metallurgy has been established. Scholarships to undergraduate students in the metals field have been made available through the ASM.

Every year hundreds of junior and senior high school students, their teachers, and their schools receive Science Achievement Awards sponsored by the ASM. Many industrial arts and vocational teachers have taken practical courses so that they can make their students more valuable as crafts in the metal working fields.

As we all proudly consider the great and successful growth of the West, we must realize the part the metal industry and metal trades have played. This is axiomatic, because almost all things are made available to the consumer today only after proper application of metals.

It should be obvious then, that the future not only of the West, but of our country as a whole, rests more on the quality of our metals industry and men than on any other factor. The present frontier is science. Only through prompt and intelligent application of scientific achievements can we progress.

Metal making and metal consuming industries then have a tremendous responsibility to foster science, encourage engineers, and develop engineering through education.

For every great scientist, our industry needs dozens of engineers in every field who are well versed in metals and their properties. For each of these engineers, this industry requires hundreds of men who have engineering training and appreciate the variety of metals, comprehend the range of properties available, and wisely evaluate their application.

This is no small undertaking. It requires the support of educational facilities of all levels above primary grades. It means the expansion of all

All these have been added to the longtime program of ASM sponsored extension courses, educational lecture series, and readily available ASM texts, transactions, and other publications.

These programs are being supported by all chapters of ASM and in many cases expanded. Our Golden Gate chapter, through its fortunate history of sustaining members, makes a scholarship available to a freshman student at Stanford and the University of California each year.

This ASM program, as generous as it is, forms only a nucleus of what is required. This program besides needing greater support and encouragement from industry, needs greater publicity throughout industry to make it more effective.

Before the goal is accomplished, participation will be increased manifold in many years. When it is accomplished, those who invested the most will receive the greatest return. That is when our Western metal industry will be "front and center."

gears with Guts



Cutaway illustrates lubrication system of Lufkin Type S and D speed reducers and increasers. The housing is filled with oil until the level is visible in glass gage.

The gear dips in the bath of oil, lubricating the gear teeth. The film of oil which adheres to the side of the gear rim is deflected by wiper 2 into oil trough 3 which is cast integral with the cover. Oil flows by grav-

ity from the trough through oil passages 4 and 5 into all bearings and returns to the sump by oil-return passages 6 and 7.

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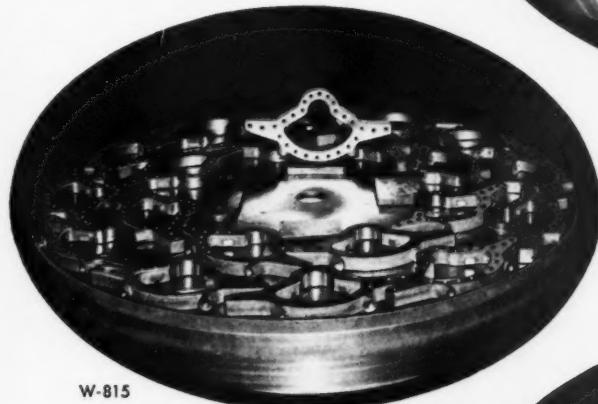
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The Jacobs Manufacturing Co.	552
Jamison Steel Corporation	654
The Jarvis Corporation	602
Johnson Gage Company	866

K	
K.D.K. Products Co.	119
Kaydon Engineering Corp.	859
Kearney & Trecker Corp.	614
Kenco Manufacturing Co.	1185
Kolcast Industries Inc.	1069

L	
Lamina Dies & Tools, Inc.	811
Landis Machine Company	965
Last Word Sales Company	610
Latrobe Steel Company	502
Lavallee & Ide Inc.	359
Lees-Bradner Company	253
Louis Levin & Son, Inc.	267
Art Lewis Production Equipment	215
Liberty Industrial Sales Inc.	221
Lincoln Industries	1071
Lindberg Engineering Co.	666
Fred G. Littlejohn Co.	1023
Lovejoy Tool Company, Inc.	861
Frank Loy & Associates	878
Lufkin Rule Company	550

M	
M-B Products Division	909
M.B.I. Export & Import Ltd.	121
Machine Products Corp.	905
Machinists' Tool & Supply Co.	255
Magnaflux Corporation	606
Marshall Steel Company	221
Marshall Tool & Supply Corp.	1071
Marvel Engineering Co.	807
Master Chemical Corporation	1004
Masters Precision Tool Sales	1013
McDonough Manufacturing Co.	922
Mechanical Engineering Co.	1185
Merrill Engineering Labs.	1041
Merr Engineering, Inc.	164
Metal Removal Company	908
The Milford Rivet & Mach. Co.	1131
Miller Fluid Power Co.	205
Modernair Corporation	406
Morton Machine Works	904
The Motch & Merryweather Mach.	915

N	
Nelco Tool Company	1018
Nelson Stud Welding Div.	159
New Hermes Engraving Mach.	457
New Plastic Corporation	418
New Standard Division	954
Nichols-Morris Corporation	261
Nopak Division	750

O	
Oakite Products, Inc.	880
Ohio Crankshaft Company	414

Company	Booth
O.K. Rubber, Inc.	1071
R. P. Oldham Company, Inc.	367
Optical Gaging Products, Inc.	514
Opto Engineering Co.	1155

P	
C. A. Pafenbach & Company	359
The Paul-Munroe Company	971
Peck Steel & Die Supply, Inc.	558
Penton Publishing Company	1036
Pfauffer Machine Co.	1177
Pioneer Broach Company	910
Pioneer Tool Engineering, Inc.	269
Pipe Machinery Company	855
Portage Double Quick Tool	109
Precise Products Corp.	821
Precision Tool Sales	610
Procurier Safety Chuck Co.	315

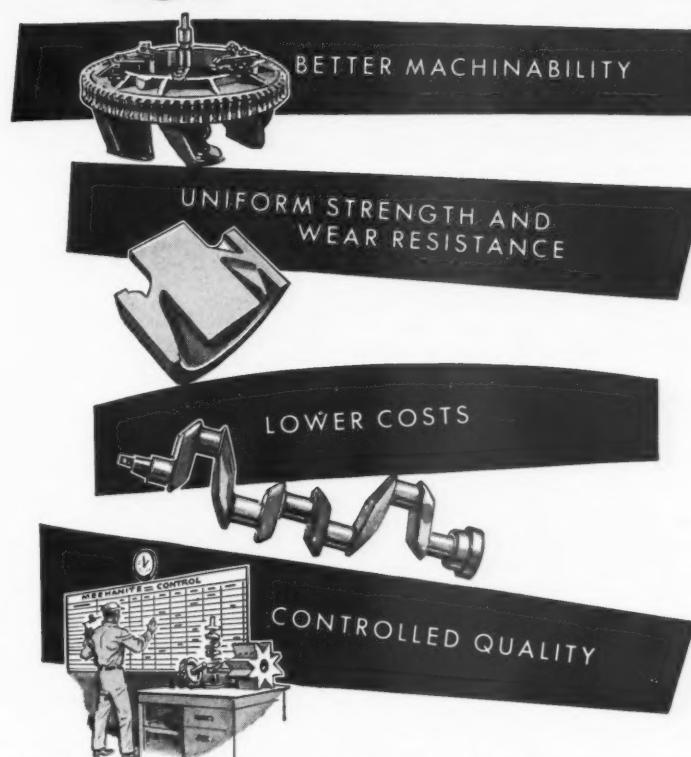
Q	
Quality Control Company	882

R	
Racine Hydraulics & Mach.	660
Rankin Bros. Engineering & Sales	1186
Ready Tool Company	1023
Red Seal Metals Company	311
Reliant Industries	855
Rezolin, Inc.	923
J. A. Richards Company	1019
Rimat Gage Company	860
Rockwell Manufacturing Co.	113
Ross Operating Valve Co.	660
Rotex Punch Company, Inc.	157
Royal Oak Tool & Machine Co.	107
The Rucker Company	706 & 710
Jos. T. Ryerson & Son, Inc.	510

S	
The S-P Manufacturing Co.	1035
Safety Socket Screw Co.	221
Sales Service Machine Tool Co.	1031
Sandusky Abrasive Wheel Co.	264
Sargent Engineering Corp.	169
George Scherr Optical Tools	458
Screw Machine Tool Co.	315
Scully-Jones & Company	554
Seibert & Sons, Inc.	920
Service Machine Company	1009
The Sheffield Corporation	656
Sheridan Products Inc.	269
Siewek Tool Company	900
Simonds Abrasive Company	504
Simonds Saw and Steel Co.	504
Simplex Machine Tool Corp.	652
Size Control Company	882
Skandia Tool Sales Co.	365
The Skinner Chuck Co.	111
Paul B. Slater Co.	953
Southern California Tool & Die Assoc.	668
Standard Gage Company	459
Standard Parts Company	919
Standard Pressed Steel Co.	1163
The L. S. Starrett Company	765
Steel City Testing Machines	1183
Sunnen Products Company	752
Super Tool Company	416
Superweld Corporation	876
Supreme Products, Inc.	221
E. D. Sweetland Company	921
Syntron Company	884

T	
Taylor Dynamometer & Mach.	862
Technical Supply Company	1170
Thalco Glass Fiber Products	1188
Thor Power Tool Company	155
Thurston Manufacturing Co.	359
Tocco Division	414
The Tomkins Johnson Co.	660
Tool Engineer	271
Tool Sales Company	909
Tool Specialty Company	1171
Trade Publishers, Inc.	355
Transmarares Corporation	1177
True-Trace Sales Corp.	167
Tubular Micrometer Company	512

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EXHIBITORS LISTS

...Begins on page 68.

Company	Booth
Union Manufacturing Co.	405
U.S. Expansion Bolt Company	954
U.S. Rubber Company	1169
U.S. Tool Company, Inc.	1089

V

The V & O Press Company	171
The Van Keuren Company	863
Vascoloy-Ramet Corporation	618
Vickers Incorporated	608
Viking Tool & Die Shops	1108
Vlier Engineering, Inc.	600

W

The Wade Tool Company	321
Waldes Kohinoor, Inc.	664
Wales-Strippit Corporation	1027
Walker-Turner Division, Kearney & Trecker Corp.	614
Warner & Swasey Research Corp.	911
Webber Gage Company	867
The Weldon Tool Company	161
Western Machinery & Steel World	217
Western Metals Magazine	1161
Wetmore Tool Sales Co.	857
Wharton & Wilcocks of Amer. Inc.	308
S. B. Whistler & Sons, Inc.	1067
Willey's Carbide Tool Co.	303
Wilton Tool Mfg. Co. Inc.	801
Wisconsin Drill Head Co.	857
Arthur C. Withrow Company	357
W. F. Wolf Machinery Co.	1083

Z

Zero Index Company, Inc.	225
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ASM, Mar. 28-Apr. 1

Company	Booth
Acetogen Cutting Gas Co. Inc.	521
Acetogen Gas Co.	472
Acme Steel Co.	677
Aeroprojects, Incorp.	528
Affiliated Metal Products	622
Air-Maze Corp.	127
Air Reduction Pacific Co.	650
Ajax Electric Co. Inc.	123
Ajax Electrothermic Corp.	123
Ajax Engineering Co.	123
Allis Co., Louis	109
Allison Co.	507
Alloy Precision Casting Co.	1055
Alloy Rods Co.	174
American Brake Shoe Co.	209
American Drill Bushing Co.	372
American Chemical Paint Co.	705
American Electric Heater	1015
American Pullmax Co. Inc.	218
Am. Soc. for Metals	761
Am. Wheelabrator & Equipment Co.	635
AmForge Division	209
Ampco Metal, Inc.	328
Amsco Welding Products Div.	209
Andrews Hardware & Metal Co.	718
Anthony Company	527
Apex Smelting Co.	676
Applied Research Laboratories	618
Arcair Company	611
Arcos Corp.	829
Armeo Steel Company	282
Arteo Co., Inc.	956
Arwood Precision Casting Corp.	271
Atlas Press Company	841
Audubon Wire Cloth Corp.	210
Austenal Laboratories, Inc.	579
Automatic Temperature Control Co.	365
Automation	168
Aviation Developments, Inc.	610

B

B-H-S Machinery Sales Co.	428
Bailey Equipment Co.	328
Bailey Industrial Supply	926

Company

Booth

Baldwin-Lima-Hamilton Corp.	466
Balteau Electric Corp.	544
Barber-Coleman Company	568
Baron Industries	511
Bateman Co., T. O.	409
Bausch & Lomb Optical Co.	264
Bechler, Andre	244
Beets Co., Henry N.	163
Bendix Aviation Corp.	762
Berkley Engineering & Equip. Co.	525
Black & Decker Mfg. Co.	115
Blackman Company, Horace	1029
Blakeslee & Company, G. S.	684
Bliss Company, E. W.	927
Braeburn Alloy Steel Corp.	415
Brake Shoe & Castings Div.	209
Branson Instruments, Inc.	528
Braun Corporation	270
Braun-Knecht-Heimann Co.	163
Bridgeport Brass Co.	162
Bridgeport Machines, Inc.	165
Buckeye Tools Corporation	750
Buehler, Ltd.	274
Burklyn Co.	119
Bush Electric Co.	163

C

Cal-Testing Machine Co.	365
California Alloy Products Co.	210
California State Polytechnic College	953
Campbell Machine Division	507
Chainveyor Corp.	170
Challenge Machinery Co.	180
Chase Brass & Copper Co.	450
Chase Steel & Supply Co.	622
Chicago Tool & Engineering Co.	563
Chromizing Company	719
Cincinnati Milling Machine Co.	560
Clementina Ltd.	1018
Clingan & Fortier, Inc.	622
Cold Metal Products Co. of Calif.	282
Coffing Hoist Company	725
Collins Industrial Supply Co.	575
Collins Microflat Co.	575
Compton Foundry Co.	366
Consolidated Vacuum Corp.	854
Continental Granite Corp.	180
Continental Metals, Inc.	622
Cook Heat Treating, Inc.	360
Cosa Corporation	244
Coulter Steel & Forge Company	564
Crane Packing Co.	626
CraneVeyor Corporation	503
Criterion Machine Works	580
Crucible Steel Company of Amer.	350

D

Darling Abrasive & Tool Co.	707
Daly Industrial X-Ray	1056
Darnall Co., W. M.	841
Deckel, Friedrich	244
De Laval Turbine Pacific Co.	127
Del Mar Co.	950
Delpark Corporation	127
Denver Fire Clay Co.	1033
deSanno & Son, A. P.	842
Despatch Oven Company	222
Detrex Corporation	409
Detroit Power Screwdriver Co.	119
Detroit Stamping Co.	737
Diamond Machine Tool Co.	482
Disston & Sons, Inc., Hurry	104
Diversey Corp.	517
Drawalley Corporation	174
Ducommun Metals & Supply Co.	227
Duhig & Company, Walter L.	579
Dutch Stark Co.	1060
Dynamic Gear Co.	1042

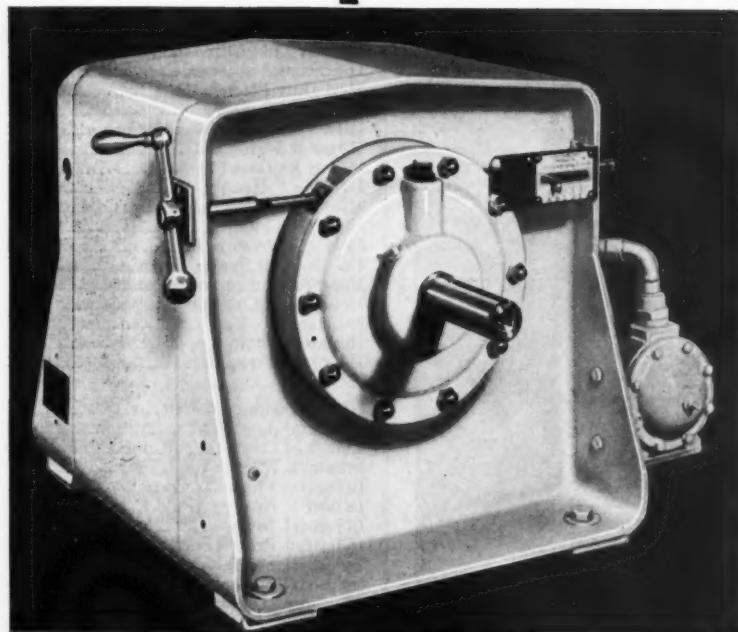
E

Eagle Metals Co.	308
East Shore Machine Products Co.	509
Eastern Stainless Steel Corp.	622
Eclipse Fuel Engineering Co.	936
Elect-Air Tool Co.	605
Electric Steel Foundry Co.	818

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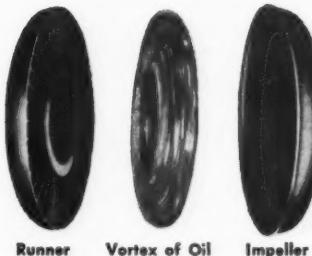
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EXHIBITORS LISTS

Begins on page 68.

Company	Booth
Electro-Alloys Division	1032
Electro-Chem Mfg. Co., Inc.	1025
Electro Circuits, Inc.	862
Electronic Engineering Assocs., Ltd.	278
Erb & Gray	934
Equipment & Materials Reporter	955
F	
Fabriform Metal Products	171
Far-Best Corporation	617
Farnes & Martig, Inc.	222
Fenn Manufacturing Co.	309
Fenway Machine Sales Co. Inc.	826

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Company	Booth
Field Abrasive Manufacturing Co.	660
Food Machinery & Chemical Corp.	1032
Frese Corp., Adolph	1047
Foundry (Publ.)	168
Foundry Equipment Co.	941
G	
Garrett Corporation	215
Garrett Supply Company	215
General Electric Co.	359
General Metals Corp.	236
General Roto Company	841
Given Machinery Company	124
Glo-Quartz Electric Heater Co. Inc.	1052
Goodrich Co., B. F.	473
Gordon Co., Claud S.	365

Company	Booth
Gordon Duff, Inc.	576
Graham Transmission (see Del Mar)	950
Grand Valley Machine & Tool Co.	938
Gratiot Co., Jules D.	127
Gray Company, Inc.	733
Gregory Industries, Inc.	226
Griffin Coil Spring Company	931
Grindley Precision Grinding Co.	729
H	

Hallidie Machinery & Equip. Co. Inc.	428
Harnischfeger Corporation	110
Harper Electric Furnace Corp.	832
Harron, Rickard & McCone	560
Harshaw Chemical Co.	811
Harshaw Scientific Division	811
Hartley, H. E.	123
Harvey Machine Co. Inc.	382
Haynes Stellite Co.	495
Heath Engineering Co.	521
Held, Herman E.	525
Heli-Coil Corporation	320
Herbert Ltd., Alfred	310
Herrmann Associates, Carl	608
Hevi Duty Electric Co.	179
Hickerson Supply Co.	507
High Voltage Engineering Corp.	691
Hilger & Watts, Ltd.	277
Hobart Brothers Co.	644
Hoffman & Heartt	281
Hoglund Engineering & Mfg. Co. Inc.	737
Holden Co., A. F.	360
Holger Andreassen, Inc.	444
Holister Coil Spring Mfg. Co.	1010
Honeycomb Structures	1006
Houghton & Co., E. F.	230
Houston Co.	271
Howard Foundry Co.	324
Hydraulic Press Mfg. Co.	428

Illinois Testing Laboratories	903
Industrial Age (Publ.)	1051
Industrial Cleaners Assn. of So. Calif.	814
Industrial Electric Co.	503
Industrial Filtration Co.	127
Industrial Heating (Publ.)	1035
Industrial News	851
Industrial Press (Publ.)	1028
Industrial Specialties Co.	328
Industrial Tectonics, Inc.	416
Instrument Laboratories	568
International Nickel Co. Inc.	308
Ipsen Industries, Inc.	694

J	
J. and H. Products Co.	426
Janney Cylinder Co.	469
Jarrell-Ash Co.	277
Jarrett Co., T. C.	222
Jenkins Publ., Inc. (Publ.)	755
Jensen Instrument Co.	568
Jensen Specialties, Inc.	942
Johnson Company, Eric S.	214
Johnson & Son, Inc., S. C.	427

K	
Kajon Manufacturing Company	119
Kalamazoo Tank & Silo Co.	841
Kennecott Copper Corp.	450
Kerns Company, L. R.	407
King, Andrew	567
Kinney Co., James P.	918 & 1019
Klaus Co., Charles E.	179
Koleast Industries, Inc.	749
Krouse Testing Machine, Inc.	315
Krouse Western Laboratories, Inc.	315
Krusen Wire & Steel Co.	905
Kwikset Locks, Inc.	381
Kwikset Powdered Metal Prod. Div.	381

L	
Laboratory Equipment Corp.	751
Lake Chemical Co.	756
Lee Company, K. O.	195
Leitz, Inc., E.	1041
Lempco Products, Inc.	664
Lepel High Frequency Laboratories	412
Lewis Associates, Dean	271

WESTERN INDUSTRY — March 1955

Company	Booth
Lima Electric Motor Company	841
Lincoln Electric Company	260
Lindberg Engineering Company	334
Lindberg Industrial Corporation	334
Linde Air Products Company	495
Linney Company, H. E.	320
Littell Machine Company, F. J.	819
Long Beach Chamber of Commerce	419
Los Angeles Dept. of Water & Power	1026
Los Angeles Steel Casting Co.	378
Loy & Associates, Frank	580
Lubrication Company of America	1037
Lug-All Company	503

M

M.B.I. Exports & Import Ltd.	625
Machine Design (Publ.)	168
Machinery (Publ.)	1028
Machinery Sales Company	310 & 949
Machinists Tool & Supply Co.	180
Magnaflux Corporation	120
Malayan Tin Bureau	108
Mallory-Sharon-Titanium Corp.	830
Manhattan Rubber Division	651
Markal Co.	756
Marwedel Company, C. W.	718
Masters Precision Tools	930
Matheson Company, W. C.	222
McCrosky Tool Corporation	580
Mead Specialties Company	119
Merit Products, Inc.	752
Merrill Brothers	572
Metal Goods Corp.	308
Metal Improvement Company	719
Metal & Thermit Corporation	265
Metallizing Co. of L. A.	810
Met-L-Chek Company	715
Meyer Sheet Metal Machinery Co.	819
Michael Agency, Claude	173
Microcast Division	579
Micrometrical Manufacturing Co.	707
Mido Products	1058
Miller Machine Tool & Gauge Shop	510
Minneapolis-Honeywell Reg. Co.	420
Montague-Harris Company	718
Morgan Machinery Co.	710
Muth-Richards Company	179

N

Naresco Equipment Corporation	608
Nash, A. W.	123
National Broach & Machine Company	575
National Carbon Company	495
National Engineering Co.	941
National Industrial Publishing Co. (Publ.)	1035
National Radiator Company	711
National Research Corp.	608
National Spectrographic Sales Corp.	270
National Supply Company	327
National Torch Tip Company	937
Natural Gas Equipment, Inc.	527
Nelson Stud Welding Division	226
New Equipment Digest (Publ.)	168
New Hermes Engraving Mach. Corp.	836
Newman Tool Die & Mach. Work, L.	580
Nobur Manufacturing Co.	833
Norton Company	460
North American Philips Company	163
Newman Wheel Dressers	580

O

Oakite Products, Inc.	680
Ohio Crankshaft Company	423
Olsen Testing Machine Co., Tinius	365
O'Neil-Irwin Manufacturing Company	718
Osborn Manufacturing Co.	941
O-Vee Gauge Company	858

P

Pacific Abrasive Supply Co.	427
Pacific Coast Die Casting Assn.	683
Pacific Coast Gas Assn.	259
Pacific Factory (Publ.)	1014
Pacific Metals Company, Ltd.	463
Pacific Scientific Company	365
Pacific Tube Company	377
Paleo Enterprises	1004

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Rust ruins machinery, metal structures and fixtures, runs up maintenance and replacement costs. Stop profit-eating rust NOW... prime metal surfaces with long-lasting RUSTMASTER. This powerful rust inhibitor, especially developed by General Paint for coating iron and steel, forms a tight, tough bond that literally absorbs old rust and prevents new rust from forming on either old or new surfaces.

RUSTMASTER is a natural for protecting structural steel, metal buildings, windows, roofs, heavy equipment, truck bodies, towers, tanks—any ferrous metal surface, inside or outside, against rust.

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RUSTMASTER can be applied without sand blasting or costly pre-cleaning. You just remove loose rust and scale with scraper or wire brush, then brush, dip or spray on RUSTMASTER. It dries to smooth, hard, brown surface; is dust free in about one hour, to handle in four to six hours. Recoats in 18 to 20 hours with any oil-type exterior finish. Won't crack, chip or peel.

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WI-3

EXHIBITORS LISTS

... Begins on page 68.

Company	Booth
Union Carbide & Carbon Corp.	195
U. S. Electrical Motors, Inc.	336
Universal Cutting & Welding Co.	937
U	
Vacuum Electronic Engineering Co.	608
Vacuum Metals Corp.	350
Vacuum Tube Products Co.	608
Van der Horst Corp. of Amer.	131
Vickers Electric Division	734
Victor Equipment Co.	414
Vinco Corporation	575
Vulcan Tool Co.	580
V	
Wall Colmonoy Corp.	1050
Weatherhead Company	741
Wells Manufacturing Corp.	559
West Point Mfg. Co.	929
Western Abrasive Supply Co.	842
Western Industry (Publ.)	915
Western Machinery & Steel World (Publ.)	604
Western Metals (Publ.)	755
Western Oxygen Co.	328
Westinghouse Electric Corp.	477 & 344
Wheelco Instruments Division	568
Wilson Mechanical Instrument Div.	365
Wirth, Charles R.	936
Wise Co., Henry H.	651
Wolf Machinery Co., W. F.	244 & 250
Wooldridge Company, W. P.	514
Wyandotte Chemicals Corp.	753
W	
Yale & Towne Manufacturing Co.	910
Young Brothers Co.	941

CLOSED CIRCUIT TV in the sawmill

WEYERHAEUSER Timber Co.'s Mill One at Longview, Wash., a Douglas fir sawmill cutting a half-million board feet per shift, has installed a closed circuit television system that helps control the flow of mill-ends and other sawmill leftovers.

The television circuit allows the company to coordinate two conveyor transfer points from a single position. The result is a smoother flow of material from the sawmill to the pulp chippers. The TV viewer is stationed at one conveyor transfer point, with the monitor screen placed so he can see at a glance what is happening at the second conveyor transfer point (on a different floor and about 100 ft. away). Sets of controls for both transfer points allow him to operate the "flipper" or switch mechanism and divert the flow of materials at either transfer point.

NEW STEAM BOILERS for San Diego

WHAT IS REPORTED to be one of the most efficient steam boilers ever built is included in the \$18,000,000 first unit of the San Diego Gas and Electric Co.'s new Encina station in Carlsbad, Calif., which will convert as many as ten railroad tankcars of water into steam each hour.

Preview of products and literature at the ASTE and ASM shows

ASTE show, March 14-18

Jig borers

The American Sip Corp. will exhibit its Hydroptic jig borers designed for high precision jig boring and milling at Booth 1077. Also to be shown is Universal measuring machine Type MU-214B.

Arrowsmith facility list

Arrowsmith Tool and Die Corp. will exhibit plastic tooling, sheet metal stampings, and steel dies at Booth 1081. Literature will also be distributed.

Optical profile grinding machine

Eric R. Bachmann Co. will show a Loewe optical profile grinding machine designed for precision form grinding of complex flat form tools, circular form tools, sectional dies, gages, templates, cams, and punches in Booth 402. Equipment catalogs to be available.

Thread rolling attachments

Landis Machine Co. will feature Lanroll thread rolling attachments, 4EXX Landmatic head, and a complete line of hardened and ground and heat treated die heads, solid adjustable die heads, collapsible taps, and solid adjustable taps in Booth 965.

Last Word radius dresser

Last Word Sales Co. will have its radius dresser on display in Booth 610. The radius dresser is a machine adaptable to various types of grinding machines for dressing radii and tangent angles and various other geometric forms into grinding wheels.

New chucks for turbine wheel machining

The Cushman Chuck Co., Booth 1079, offers information on chucks for machining large turbine wheels and jet engine discs and rings.

Indicator depth gage

A. G. Davis Gage and Eng. Co., Booth 959, introduces for the first time to the West Coast completely standardized indicator depth gages with interchangeable gage components.

Circularity-grinding attachment

Literature describing products of *Detroit Reamer & Tool Co.*, manufacturers of a new circularity-grinding attachment, will be offered in Booth 874.

Dickerman die feeds

Production line display and information about *H. E. Dickerman Manufacturing Co.* die feeds will be offered in Booth 558.

Power cut-off saws

Information on a new power cut-off saw designed to use high-speed steel blade will be available from the *DoAll Co.*, Booth 760.

New metals development

Low-cost rolled magnesium plate will be featured for tooling applications by *The Dow Chemical Co.*, Booth 809.

Abrasive belt machines

A pocket-sized booklet on Porter-Cable abrasive belt machines and their advantages will be available from *The Engelberg Huller Co., Inc.*, Booth 1085.



FOUNDRY EDUCATIONAL PROGRAM. Ed. E. Walsh, national director, Foundry Educational Foundation, Cleveland, Ohio, reported to the Northern California chapter, American Foundrymen's Society, in January on the possibility of a foundry course in some Western university, supported by the Foundation. Hope to start in the 1956-1957 term at San Jose State, Stanford or Cal. In picture, from left: John Birmingham, chapter chairman; James Campbell, foundry instructor at Cal.; Mr. Walsh; Ernest F. Narquardson, vice-president, Pacific Steel Casting Co., Berkeley.



AMERICAN WELDING SOCIETY participants in Western Metal Congress. (Left) Russell Meredith, supervisor welding research, North American (Downey), co-chairman. (Right) J. B. Arthur, senior research engineer, same plant, speaker on fusion weldability of 245T aluminum alloy.

SHOW PREVIEWS

... Begins on page 77.

New electron drill

M-500 electron drill will demonstrate machining of various intricate shapes and dies in cemented carbide materials at the *Elox Corp.* booth, No. 819.

Roller gear drives

A variety of catalogs will be available describing *Ferguson Machine and Tool Co., Inc.*, roller gear drives and other equipment at Booth 973.

Hydraulic valves and cylinders

Galland-Henning Manufacturing Co. will exhibit its complete line of air and hydraulic valves and cylinders in Booth 750.

High speed precision lathes

Hardinge Brothers, Inc., will demonstrate its high speed precision lathes, chucking machines, turning, facing and boring machines, and milling machines in Booth 506.

Two new chuck lines

Horton Chuck Division of E. Horton and Son Co. will show two new chuck lines, featuring the Tru-Set chuck with a guaranteed accuracy of .0002 in. T.I.R., in Booth 1023.

Automatic screw machines

Hudson Automatic Machine and Tool Co. will demonstrate Swiss type automatics, combination tool grinding and lapping machine, and cam tracer and cam milling attachment in Booth 361.

Screw thread analyzer

The Johnson Gage Co. will feature a complete line of ring-snap, roll-snap gages, comparators, and accessories, besides a screw thread analyzer, in Booth 866.

Adjustable torque driver

Scully-Jones Co. will be demonstrating its new Safe-Torque drivers and a variety of other products in Booth 554.

Measuring instruments and machine tools

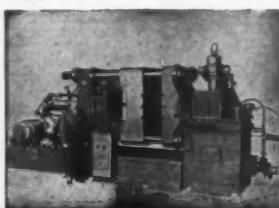
The Sheffield Corp. will display gages, measuring instruments, machine tools, and threading tools in Booth 656.

BETTER QUALITY EQUIPMENT FOR THE METALWORKING INDUSTRIES

KUX DIE CASTING MACHINES

Kux produces the most complete line of air or hydraulically operated machines for lead, tin, zinc, aluminum, brass or magnesium die casting with a size and model for every die casting need. Simple and safe to operate these machines are low in original and upkeep costs and are used in hundreds of plants in round the clock production.

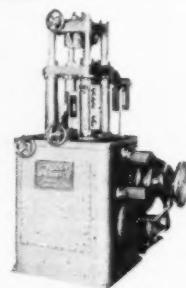
All machines are equipped with extra large oil reservoirs, oversize oil coolers and filters. They have a speed shot up to 1200 feet per minute and a range in locking pressures up to 1000 tons.



"CALL FERNHOLTZ FIRST"
For Complete Information

KUX TABLET PRESSES

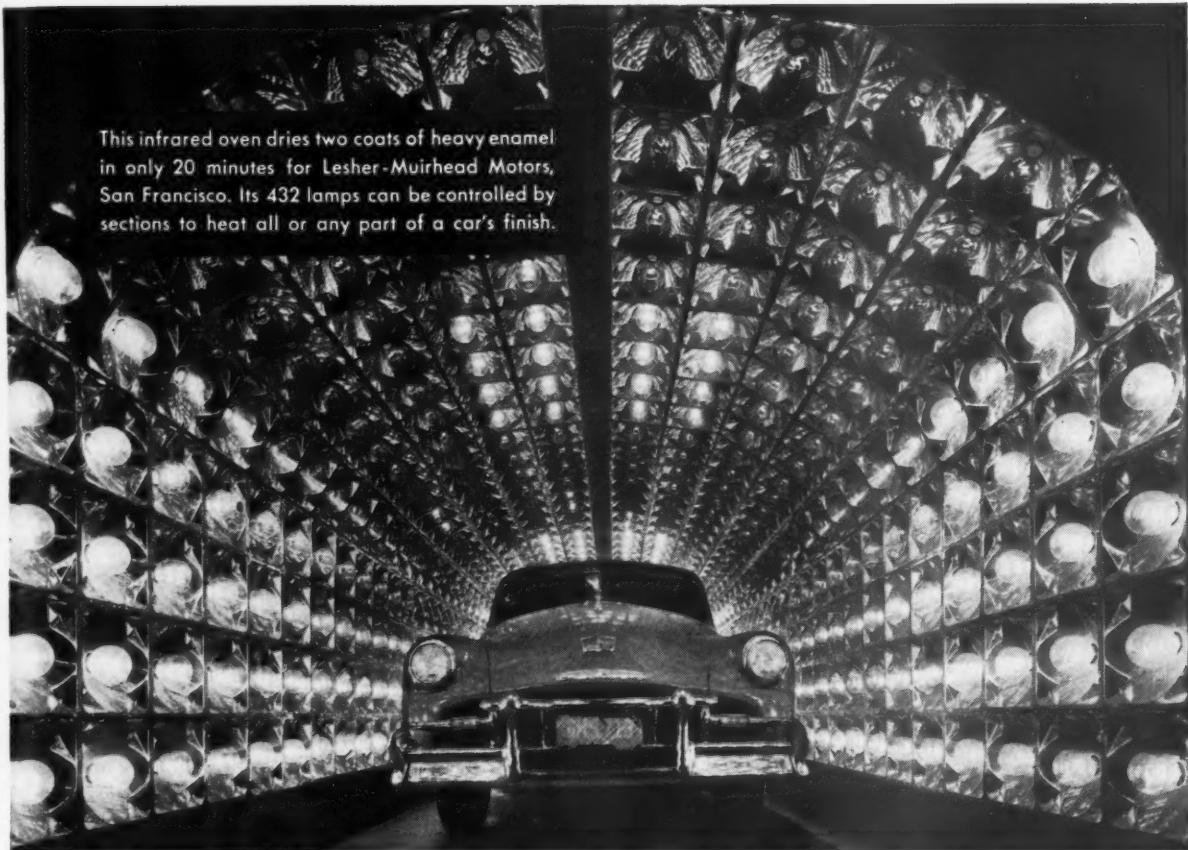
Kux Presses have become the accepted standard machines for automatically forming, at high production speeds, tablets and parts from dry, powdered or granulated materials. They are available in the Spindle, Toggle, Multiple Motion, Rotary, and the big, new 400 series of totally enclosed, mechanical and hydraulic powdered metal presses with a range in capacity to 1000 tons and 15" diameter tablets. Rigidity of design and ruggedness of construction enable these machines to meet the most severe demands for service. In addition to their standard line of tablet presses Kux also manufactures special presses for automatic sizing or coining.



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Infrared heating-

how it can work for you

Infrared heating is doing many different jobs for industry today: baking enamel finishes . . . drying chinaware, metal parts, and ink . . . curing shell molds and various finishes . . . dehydrating foods of many kinds.

You name it, electric heating can do it! Infrared is just one of the almost countless ways electric heating can work for you. There are also electric tubular heaters, immersion and insertion heaters, clamp-on, cartridge and strip heaters, to name just a few. Fact is, electric heating is unmatched for versatility, as

For drying, dehydrating, or baking materials of all sizes and shapes . . . or curing many types of finishes . . . infrared heating can't be beaten. Its radiant energy heats instantly when it contacts the work. This heat is constant and uniform, and the degree of heat can be changed easily. Infrared heating takes a minimum of manpower and lends itself readily to production-line use. It's safe, too, because there's no excessive heat around the oven, and the source of heat—the filament—is completely enclosed. And you'll find that infrared lamps, sockets, and oven walls are moderately priced.

well as for safety and ease of control. It can give you small amounts of energy at high temperatures, or large amounts of energy at low temperatures. For more facts about how infrared or any other form of electric heating can raise your production volume and quality, call your local P. G. and E. office today.

P·G and E·

Pacific Gas and Electric Company

405-X-355

March 1955 — WESTERN INDUSTRY

79

SHOW PREVIEWS

Begins on page 77.

"Free-machining" die steels

Latrobe Steel Co. will present the performance story of its XL high speed steels and free-machining FM high-carbon, high-chromium die steels in Booth 502.

Full line precision tools

Lufkin Rule Co. will display its full line of precision tools, tapes, and rules in Booth 550.

Master coolant

Master Chemical Corp. will distribute literature on the use of Trim, the Master coolant developed especially for modern machine tools, in Booth 1004.

New vertical mill

A completely new vertical mill will be featured in a colorful catalog on Masters Arboga machines at Booth 1013.

Drill and carbide tool grinder

Bulletins covering the Sterling Model DA drill and carbide tool grinder, Sterling Bench Model DB, Sterling Model G-2 universal tool and cutter grinder, and Sterling Model RK-2 tool and cutter grinder on exhibit for *McDonough Manufacturing Co.*, Booth 922, will be available.

Pioneer broaching machines

Pioneer Broach Co. will demonstrate production Model VM215 on broaching production jobs and will have samples of broaching jobs and broach tooling for inspection at Booth 910.

Drilling machines

A complete set of catalogs including the Portage No. 4 horizontal boring, drilling, and milling machine will be available from *Portage Double Quick Tool Co.*, Booth 109.

Oakite Rustripper

This new alkaline rust remover and CrysCoat process of iron and zinc phosphate treatments will be among the products featured by *Oakite Products, Inc.*, in Booth 880.

Hydraulic power transmission

The Paul-Munroe Co. plans to exhibit three principal advantages of hydraulic power transmission: (1) high linear force or rotary torque, (2) effortless control of either, and (3) infinite speed control possible, in Booth 971.

Aluminum plate and bar

Red Seal Metals Co. will display actual production units ranging from intricate precision designs to simple types of tools and fixtures made from a relatively new alloy, cast aluminum tooling plate. Booth 311.

Toolplastiks

Tools fabricated from Toolplastiks, products made from these tools, and *Rezolin, Inc.*'s complete line of raw materials will be displayed in Booth 923.

High production power equipment

The S-P Manufacturing Corp. will have available literature on power chucks, rotating air cylinders, air valves, accessories, and other equipment in Booth 1035.



Shell Process Bonding Machine Equipped with NOPAK 8" Model D Cylinder.

This machine which produces shell molds employs 2 NOPAK Cylinders to invert investment box and to open the louver which releases the mix.

Pacific Coast
Representatives

THE WILLARD
ENGINEERING CO.
Los Angeles 7, Calif.

TRANSMISSION
ENGINEERING CO.
San Francisco 5, Calif.

J. J. O'BRIEN
Portland 11, Oregon

E. C. GRIFFIN CO.
Seattle 4, Wash.

JOHN F. WOODHEAD
c/o Sales Eng. Co.
Salt Lake City, Utah
WESTERN MACH. CO.
Spokane 11, Wash.

SHELL PROCESS Equipment Utilizes NOPAK Cylinder Power

Builder of "Shell Molding" Equipment...Shell Process, Inc., of Chicopee, Mass., employs NOPAK Cylinders in a number of its machines to provide the controlled power necessary for their successful operation.

The top illustration shows a bonding machine utilizing the shell molds produced in the machine pictured below. An 8" Model "D" NOPAK Cylinder advances and retracts the upper pressure plate which, in turn, applies the pressure, through pins and springs, required to seal the two halves of the shell mold before molten metal is poured between them.

The lower picture shows a machine which produces shell molds by the investment process, employing a 4" NOPAK Cylinder to operate the louver of the investment box containing the sand and resin mix which is deposited on the heated pattern. A 6" NOPAK Cylinder, visible in base, rotates the investment box 210°.

Whether you build machines for resale, or for use in your own plant, NOPAK Cylinders and Valves can be used to your advantage in the efficient application and control of fluid power.

GALLAND-HENNING NOPAK DIVISION
2749 SOUTH 31ST STREET • MILWAUKEE 46, WISCONSIN

Visit Booth 750
A.S.T.E. Show
Los Angeles
March 14-18

Representatives in
Principal Cities.

NOPAK
VALVES AND CYLINDERS.
DESIGNED for AIR and HYDRAULIC SERVICE

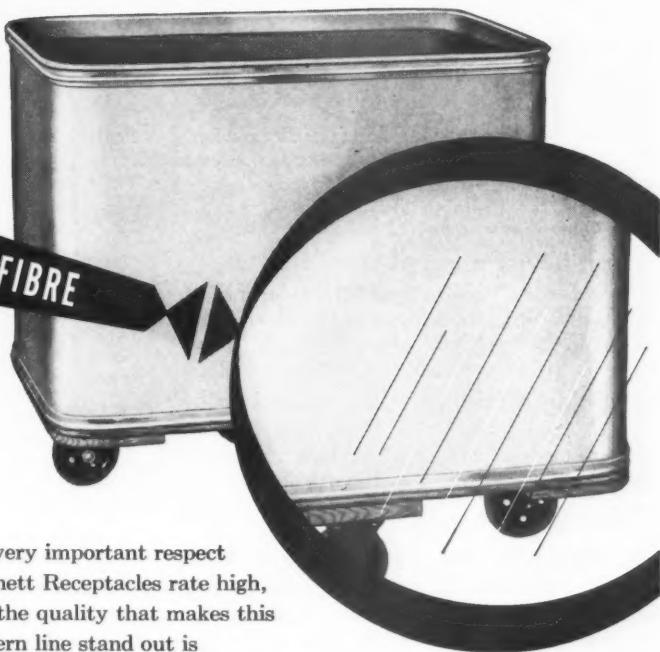
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See us in Booth 750 at the ASTE Show

WESTERN INDUSTRY — March 1955

Kennett receptacles are lighter—last longer

* THE SECRET IS IN THE FIBRE



* National's Hard Vulcanized Fibre



In every important respect Kennett Receptacles rate high, and the quality that makes this modern line stand out is National's Hard Vulcanized Fibre.

IF YOUR REQUIREMENT IS STRENGTH—this is the line for you. Hard Vulcanized Fibre is one of the strongest industrial materials known to man . . . it is *tough, rugged, hard, smooth and resilient*—capable of absorbing the toughest kind of use . . . and abuse.

IF YOUR JOB REQUIRES LIGHT-WEIGHT EQUIPMENT—with all their strength Kennett Receptacles are also light-in-weight. Hard Vulcanized Fibre is half the weight of aluminum. This helps increase employee efficiency because you can move more materials in less time with Kennett—the weight is in the load—not in the container.

IF YOUR PRIME INTEREST IS ECONOMY—Kennett Receptacles have a proven record for reducing materials handling costs. Kennett equipment will provide many years of long, hard service life without replacement, maintenance or repair.

IF YOUR NEEDS ARE IMMEDIATE—conveniently and economically for you, the Kennett Line is warehoused in San Francisco and Los Angeles ready to ship and use in your plant NOW!

NEW KENNETH CATALOG

Here's your personal guide to the finest materials handling receptacles ever built. Write for a free copy of catalog W-1.



FIBRE SPECIALTY DIVISION NATIONAL VULCANIZED FIBRE CO.

SAN FRANCISCO • 273 SEVENTH STREET

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NATIONAL ALSO MANUFACTURES VULCANIZED FIBRE • PHENOLITE LAMINATED PLASTIC • VUL-COT WASTEBASKETS • TEXTILE BOBBINS

SHOW PREVIEWS

... Begins on page 77.

Rapid action disc grinder

Rankin Brothers Engineering, Inc., will exhibit, among other machines, a new rapid action disc grinder for rapid working of wood, metal, or plastic materials in their booth, No. 1186.

Optical tools

Optical dividing head, Leitz Perflectometer, vertical measuring machine, toolmakers' microscopes, and Wilder micro-projectors will be exhibited by *George Scherr Optical Tools Inc.* in Booth 458.

45-ton power press

Sales Service Machine Tool Co. will be exhibiting a new 45-ton Press-Rite power press equipped with steel tie rods and an oversize 4-in. crankshaft, in Booth 1031.

Balancing machines

Taylor Dynamometer and Machine Co. will be offering bulletins on their static universal balancing machines, precision drilling machines, and hydraulic absorption dynamometers, in Booth 862.

Four machine tools to be shown

New literature on Karstens universal cylindrical grinder, precision tool room lathe, high precision lay-out and measuring table, and ABA optical jig borer will be offered by *Columbia International Corp.*, Booth 100.

Grinders and presses

Bell Equipment Co. will offer literature on grinders, production die presses, and other machine tools from three manufacturers at Booth 704.

Optical tooling equipment

Charles Bruning Co., Inc., in Booth 702, offers literature on newly improved Brunson instruments, tracing paper and cloths, and a new high speed reproduction machine.

Universal scroll chucks

Catalog 53, describing precision scroll chucks with hardened keyways as a standard feature, will be offered by *Buck Tool Co.*, Booth 1033.

Cemented carbide tools and blanks

Wear parts, thermistors, permanent magnets, and cemented carbide tools and blanks will be exhibited by *Carboloy, Department of General Electric Co.*, in Booth 456.

New cutting oil base

Cincinnati Milling Products Division, Cincinnati Milling and Grinding Machines, Inc., Booth 412, will offer publication PC-309 describing a new cutting oil base called Cimcut base additive.

Delta drill press

Rockwell Manufacturing Co. will show a new 14-in. drill press recently added to the company line, in Booth 113.

Control Gases to 10,000 P.S.I. WITH VICTOR GAS-O-DOME REGULATORS



**VICTOR'S LONG EXPERIENCE
IN PIONEERING HIGH PRESSURE
GAS REGULATION** is yours for the asking. For details, and complete data on Gas-O-Dome Regulators, see your VICTOR dealer or write us for catalog 341. Dealer inquiries invited.

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment, hardfacing rods; blasting nozzles; cobalt & tungsten castings.

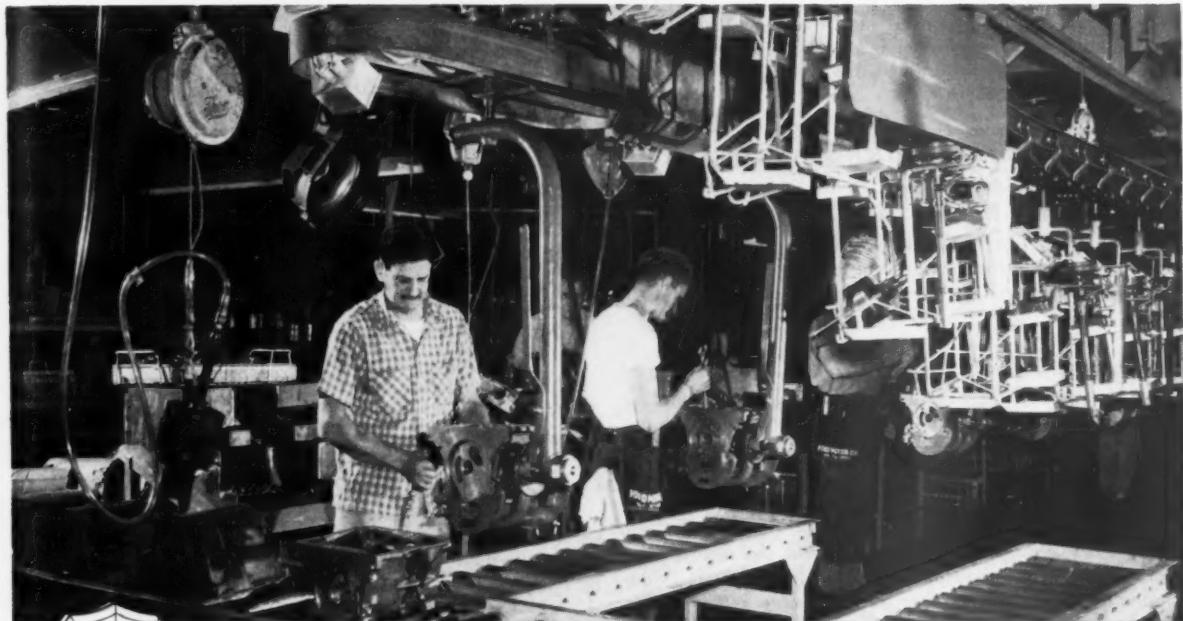
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GAS-O-DOME SERIES	DELIVERY RANGE (p.s.i.)	SPECIAL FEATURES	GASES HANDLED
GD 30	0-2500	High Delivery Flow Rates. Accurate Valve Control.	Air Argon Helium Hydrogen Nitrogen Oxygen —and others
GD 31	0-3600		non-corrosive to bronze and stainless steel.
GD 61B	0-2500	Excellent Capacity. Compact — 7 lb. — 4" x 6" x 6". —67° to +160° F. Range.	
GD 62B	0-3600		
GD 80	0-5000	Accurate Valve Control. —67° to +160° F. Range.	
GD 81	0-10000		
GD 10	0-500	Self-Relieving Pilot Regulator Control. High Flow Rates.	
SR 10	0-1000	High Pressure, Low Flow. Com- pact — 4 lb. — 2" x 6" x 6".	
SR 100	0-30 & 0-40	Corrosion Resistant.	Ammonia (wet or dry) Boron Trifluoride Chlorine (wet or dry) Hydrogen Sulfide, Hydrogen Chloride, Sulfur Dioxide—and other corrosive gases.

See us in Booth 414 at the Western Metal Exposition

JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION



POWER and FREE CONVEYORS PROVIDE *Flexibility for Assembly, Testing, Live Storage*

This Webb "Power and Free" conveyor system, in the automatic transmission plant of one of the "Big Three" automobile manufacturers, is a prime example of accomplishment in efficiency, reduction of production costs and elimination of manual materials handling.

Starting in the sub-assembly area, a Webb overhead trolley conveyor carries parts to the final assembly department (shown above) where two "Power and Free" conveyors take over and carry the transmissions through every assembly operation. After assembly is completed, another "Power and Free" conveyor provides live overhead storage for the transmissions until they can be taken by conveyor to the test stand area.

In a similar manner, all fifteen "Power and Free" conveyors,

located throughout the plant, are synchronized into an automatic system that is thousands of feet long. From the receiving of transmission parts, through final assembly, several live storage areas, testing, and delivery to shipping, the transmissions never leave the Webb "Power and Free" Conveyors.

With Webb "Power and Free" conveyor systems, the power is transmitted from pushers on the power trolleys to the free trolleys which carry the load. When power is not required at specified storage or stationary assembly locations, the power line is raised to disengage the free trolleys. An ever increasing number of manufacturers are finding this system an ideal solution to their production requirements for a conveyor that provides a combination of automatic handling, stationary assembly facilities and live overhead storage.

Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports, and new product literature.

JERVIS B. WEBB CO. of CALIFORNIA

9301 RAYO AVENUE

SOUTH GATE, CALIFORNIA

Specialists in Custom Conveyor Systems

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SHOW PREVIEWS

Begins on page 77.

Tool life test

Joseph T. Ryerson & Son, Inc., will conduct a tool life test to demonstrate improved machinability of Rycut 40 leaded alloy steel over non-leaded steels in the same carbon range in Booth 510.

ASM show, March 28-April 1

Micro carbide finisher

The Garrett Corp. will display Garco, the mechanical man with an electronic brain and an improved micro carbide finisher, using an improved diamond compound, in Booth 215.

Complete, 180-ft. conveyor

Chainveyor Corp. will demonstrate features including ease of installation and flexibility, of a complete Chainveyor system 180 ft. long. System can operate on any of four types of power drives. Booth 170.

Jetweld

The Lincoln Electric Co. offers Jetweld, the second electrode in its newly developed line of electrodes. It is designed especially for welding butt and deep groove joints and has powered metal in the covering which is claimed to be a radical departure from previous electrodes. Booth 260.

Substitute for acetylene

Acetogen Gas Co. will display its Acetogen gas cutting steel in Booth 472. This gas is intended to replace acetylene in all usages for cars, trucks, buses, tractors, and aircraft.

200 pieces of literature

Air Reduction Pacific Co. will have approximately 200 different pieces of literature available describing the company line of equipment, some of which will be displayed in Booth 650.

High frequency induction melting

Ajax Electrothermic Corp. will show its high frequency induction melting furnace for both ferrous and non-ferrous metals in Booth 123.

Cutting wheel pamphlet

The Allison Co. will have a pamphlet on masonry cutting blades, snagging wheels for portable grinders, and rubber and resinoid cut-off wheels available in Booth 507.

Low hydrogen electrode

Alloy Rods Co. will exhibit, for the first time in the West, a new concept of low hydrogen electrode called Atom-Arc in Booth 174.

Shearing and forming machines

American Pullmax Company, Inc., will exhibit its line of Universal shearing and forming machines in Booth 218.

Gouging and cutting torch

Arcair Co. will be offering information on the Arcair torch, an electric air and compressed air torch for gouging and cutting, in Booth 611.

Metallurgical instruments

Bausch & Lomb Optical Co. will demonstrate a complete line of optical metallurgical instruments including the Balphot Metallograph with its Magna-Viewer projection screen in Booth 264.

Machine tool literature

The Cincinnati Milling Machine Co., makers of machine tools for broaching, milling, grinding, lapping, and cutter sharpening, will offer literature on its new hardening machine in Booth 560.

Granite surface plates

The Challenge Machinery Co., manufacturers of Clovis-Black surface plates, will have literature available and equipment on display in Booth 180.

Sandblasting equipment

Clementina Ltd. will be offering literature on its sandblasting equipment, including abrasive blasting machines, cabinets, nozzles, hose, safety equipment, and accessories in Booth 1018.

Several kinds of hoists

Coffing Hoist Co. will be offering literature on the Super Power ratchet lever hoist and the Cable Quik-Lift electric hoist which will be on display in Booth 725.

Cold metal products

A number of finished products made from *Cold Metal Products Co. of Calif.* steel will be on display in Booth 282.

Vacuum melting and casting furnace

Consolidated Vacuum Corp., subsidiary of *Consolidated Engineering Co.*, will offer literature on a new 5-50 lb. high vacuum melting and casting furnace at Booth 854.

Foundry ovens

Despatch Oven Co. will be offering literature on its line of furnaces and other heat treating equipment and will display a working model of an aluminum solution heat treating furnace in Booth 222.

Aluminum processing methods

The Diversey Corp. will feature two demonstrations of advanced aluminum processing methods on a reduced scale in Booth 517.

Stainless steel sheet and plate

Eastern Stainless Steel Corp. plans to distribute copies of pamphlets entitled "Range of Sizes," and "Eastern Stainless Steel Sheets and Plates," in Booth 622.

X-ray generator

High Voltage Engineering Corp. offers literature on its 1,000,000-volt Van de Graaff x-ray generator for radiography to be shown in Booth 691.

Alnor Pyrotroller

Illinois Testing Laboratories, Inc., will be offering literature on the Alnor Pyrotroller, a compact electronic indicating and controlling pyrometer, in Booth 903.

Shaker hearth furnace

Hevi Duty Electric Co. will display a shaker hearth furnace equipped with an automatic parts feeder; a quench tank conveyor; and a Quench-O-Trol unit for maintaining exact temperature of the quenching oil, in Booth 179.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .



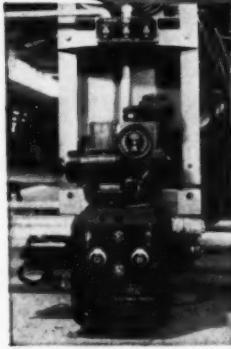
The Airco Duograph #48 cutting machine equipped with Electronic Tracer*. Note simple, sturdy construction and centralized control station. Basic tracing area 48" x 51". Additional tracing table increases length to 131".

*optional equipment (in place of manual tracer) at additional cost

Visit Western Metals Show...
Booth #650

The NEW AIRCO #48 DUOGRAPH

the first rectilinear shape cutting
machine that gives you the accuracy
you want...at a price you can afford



Choice of 3 tracers. Use the sure, accurate Airco Electronic Tracer, the magnetic tracer, or manual tracer, according to type of work. Tracer equipment is interchangeable.

In producing close-tolerance parts, the Airco #48 Duograph is as accurate as heavier, more expensive pantograph-type machines. Cuts are sharp-edged, free of slag or scale. Cuts up to four 4-foot circles at once. Solenoid operation and centralized controls save gas, speed work. Ask your Airco Representative for illustrated booklet containing full details—or write to the address below.

\$3450 (complete machine
with manual tracer)

featuring:

- 48" x 51" cutting area (one table)
- up to 4-torch operation
- centralized controls
- gas-saving solenoid valves
- accurate cuts



AIR REDUCTION PACIFIC COMPANY

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Air Reduction Pacific Company is a division of Air Reduction Company, Incorporated. Principal products of other divisions include: PURECO — carbon dioxide, liquid-solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • AIRCO — acetylenic chemicals • COLTON — polyvinyl acetates, alcohols and other synthetic resins.

See us in Booth 650 at the Western Metal Exposition

March 1955 — WESTERN INDUSTRY

SHOW PREVIEWS

...Begins on page 77.

Ultrasonic fluxless soldering

Aeroprojects, Inc., will have its Sonobond ultrasonic fluxless soldering equipment including Model No. S-3-H-54-11, in Booth 528.

From cement to power

American Brake Shoe Co. will display equipment from American Manganese Steel Division (welding equipment); Electro-Alloys Division (heat resistant castings); AmForge Division (drop, upset, and press forgings); Brake Shoe and Castings Division (abrasion resistant castings and gray iron castings), in Booth 209.

Die-Draulic grip unit

Grand Valley Machine & Tool Co. will show its Die-Draulic grip, a device whereby ample pad holding pressure may be built into a new die or added to an old one, in Booth 938.

Rotary table for surface grinders

Vulcan Tool Co. will be exhibiting a rotary table for surface grinders, an air operated tool using regular air line sources for power and attaining variable speeds of 40 to 100 rpm., in Booth 580.

Electrolytic hard chromium

Spar-Tan Engineering Co. will distribute literature describing the reclamation of hundreds of worn-out cylinders and other engine and landing gear parts through engineering application of electrolytic hard chromium in Booth 131.

Micrometer caliper

The L. S. Starrett Co. will have the new Starrett Mu-T-Anvil micrometer, featuring interchangeable anvils, on display in Booth 630.

New tapping attachment

Tapmatic Corp. will exhibit the Tapmatic 300 tapping attachment, designed to eliminate the human variable and operating on the SPV "weightless tapping" principle in Booth 214.

Temperature-indicating materials

Tempil Corp. will exhibit its line of temperature-indicating materials including Tempilstiks, temperature-indicating crayons; Tempilaq, temperature-indicating liquids; and Tempil pellets, temperature-indicating pellets, in Booth 323.

Spot welding equipment

Linde Air Products Co. will demonstrate sigma spot welding equipment and a conversion kit for changing the manual sigma torch to the spot welding torch in Booth 495.

Complete line of motors

U. S. Electrical Motors, Inc., will display the complete company line of motors including Uniclosed, Varidrive, and Syncrogear in Booth 636.

Ultrasonic fluxless soldering

G. D. Smith Co. will have a demonstration of the Sonobond for ultrasonic fluxless soldering for the first time, Vidigage for measuring thicknesses, and the UR Reflectoscope, among others, in Booth 528.

SEATTLE

SAN FRANCISCO

LOS ANGELES

3 CONVENIENT WEST COAST SERVICE CENTERS

FACTORY SALES REPRESENTATIVES FOR *Atlas Roller Chain • Sewall Roller Chain Sprockets*

BARRY STEEL SPLIT PULLEYS

Scientifically designed. Electrically welded. Light weight. Easily installed. Maintain exact shape under all loads.

DICK ROPE QD SHEAVES

Heavy duty "quick-demountable." On or off shaft in minutes. No wobble or loss of balance. 802 stock sizes fit over 25,000 stock drive combinations from $\frac{1}{2}$ to 600 hp. Also . . . stock V-Belt drives and "special" sheaves for every application.

Faster Service on **DEPENDABLE Dick Power Transmission and Conveying Equipment**

You'll get immediate attention and fast deliveries when you contact one of R. & J. Dick Company's three easily accessible West Coast offices and warehouses — at Los Angeles, San Francisco or Seattle. Each center is stocked with the complete line of **dependable** Dick power transmission and conveying equipment . . . accepted by manufacturers who rely on the Dick line to help them avoid costly breakdowns and production delays. For information on how you can step up your plant's efficiency, call or write the office nearest you.

DICK'S BALATA BELTING

Hard surface, closely woven duck, thoroughly impregnated with Balata Gum. Free from stretch and shrinkage. Moisture resistant. High transmission efficiency.

BARRY CONVEYOR PULLEYS

Light weight combined with super strength. Welded steel construction. Easily installed. Wide range of sizes for all general conveyor services.

3 Convenient West Coast Service Centers

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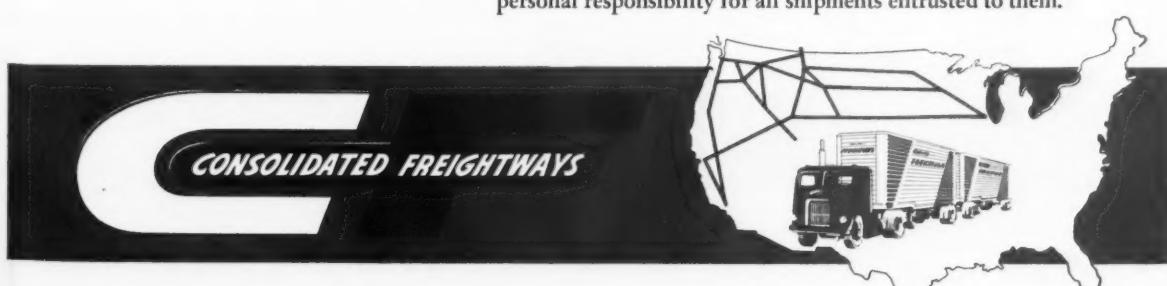
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How **GREEN PAINT** benefits *CF shippers...*

"Green Paint" symbolizes a philosophy developed over the years by employees of Consolidated Freightways. For shippers, it results in a service superior in every possible way—because to every CF employee, "Spreading Green Paint" means—

Alertness to the responsibilities and opportunities in serving customers . . . *Enthusiasm*, friendliness and efficiency in daily contacts with shippers . . . *Promptness* in pick-ups, schedules, deliveries . . . *Safety* and courtesy on the highway . . . *Pride* in their company and its accomplishments . . . Above all, a feeling of personal responsibility for all shipments entrusted to them.



SEATTLE • PORTLAND • SAN FRANCISCO-OAKLAND • LOS ANGELES • SPOKANE • SALT LAKE CITY • MINNEAPOLIS-ST. PAUL • CHICAGO
Terminals in 49 other key cities from the Pacific Coast to the Great Lakes...Thru service to all major eastern cities

SHOW PREVIEWS

... Begins on page 77.

Research and control instruments

North American Philips Co., Inc., Research and Control Instruments Division, will exhibit a flame photometer, microradiograph, electron microscope, and Portaflux magnetic particle test unit in Booth 163.

An optical pyrometer

The Pyrometer Instrument Co., Inc., will demonstrate pyrometers designated optical, micro-optical, radiation, immersion, surface, and indicating, in Booth 525.

Power press brake

O'Neil-Irwin Mfg. Co., will display a new 36-in. power operated press brake said to develop 12 tons of power through the use of a combination mechanical and hydraulic system, in Booth 718.

Osborn Rota-Lift

Otto H. Rosentreter will put the Osborn Rota-Lift through its paces and will show a small working model of the National hydro-filter in Booth 941.

Hydraulically operated cutting head

A. P. de Sanno & Son, Inc., will exhibit Type JH Radiac abrasive cut-off machine with hydraulically operated cutting head and new abrasive grinding wheel in Booth 842.

Resistance welding

Sciaky Bros., Inc., will have $\frac{1}{8}$ -in. scale models and four application stories placed in panels above these models besides a variety of literature available in Booth 223.

Production cutting fluid

E. F. Houghton & Co. will demonstrate its high production cutting fluid, Antisep all-purpose base, mixed 1 to 25 with water, on an automatic screw machine in Booth 230.

Ellis casting process

Howard Foundry Co., will exhibit castings produced by the Ellis casting process for the first time in Booth 324.

Another hydraulic press

Industrial Tectonics, Inc., will have a hydraulic press with a specially designed ball recirculating fixture to show production sizing of internal diameters in Booth 416.

Centrifugal castings

Janney Cylinder Co., will make available catalogs describing alloys produced in the form of centrifugal castings and others, in Booth 469.

Cutting and grinding

S. C. Johnson & Son, Inc., will distribute literature describing Johnson's wax lubricants and cutting fluids in Booth 427.

Portable hardness tester

Andrew King will offer a four-page illustrated folder describing the King portable Brinell hardness testers, also usable as a bench tester, in Booth 567.

Power drives

Sterling Electric Motors, Inc., plans to distribute a number of brochures describing the company line of power drives and multi-mount reducers in Booth 410.

**NOW YOU CAN HAVE
QUALITY
CONTROL**

with the ALPINE

**COMPETITION IN
MODERN BUSINESS**

demands that you provide
under your own roof and
under your own supervision

CONTROL OF HEAT TREATING

**CONTRO-THERM
PROCESS
OF HEAT TREATING**

The most important process involved in the manufacture of your product

**Zephyr Manufacturing Company says
cautiously,**

"We were reluctant to attempt our own heat-treating operations but, due to the problems encountered in obtaining satisfactory processing commercially, we were forced to install our own equipment."

"To date we are extremely well satisfied with our results obtained in improving and controlling quality. I am sure we could not have a more reliable and satisfactory installation than we have in the Alpine Contro-Therm equipment."

"We have had excellent results in heat-treating seminole type steel in addition to having solved our problems of production heat treating of screwdriver bits."

**Pomona Tile Manufacturing Company writes
enthusiastically,**

"During our expansion in 1950, we had two sets of dies made in an outside shop that had heat-treating done by a commercial heat-treater. These two sets of dies were not as good as our own dies hardened in our Alpine furnaces at the same time."

"The first set had to be replaced in two months, the second in three months, due to heat-treating cracks. With our own set, hardened in our Alpine furnaces, at the end of nine months, the die ring was turned over and had an equal amount of wear remaining on the other half of the die ring."

"I might add that these presses operate sixteen hours per day five days per week and make an average of 4000 impressions in an eight hour shift."

Only the Alpine Furnace maintains a positive protective self-generated atmosphere.

• Guaranteed Lower Costs • Less Processing Time • Consistently Better End-Product

WRITE A. D. Alpine, Inc.

11837 Teal Street, Culver City, California



Here's the new cost-cutting answer to conveying problems!

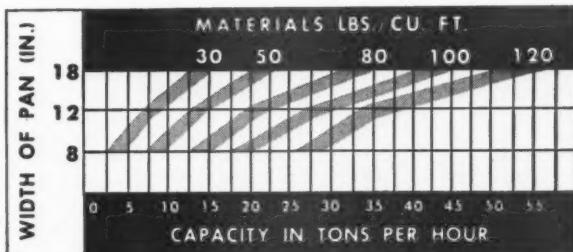
Immediate Delivery on Hewitt-Robins Springmount Vibrating Conveyor Systems to Handle Almost Any Material . . . For Unlimited Distances . . . With Minimum Power Requirements!

The new, low-cost Hewitt-Robins Springmount Vibrating Conveyor is the answer to your materials handling problems. Designed for efficiency in action, the balanced-vibration principle of this new conveyor unit results in low dynamic loads . . . units up to 100 feet run on just a one horsepower drive! Compared to other conveying mediums the new Hewitt-Robins Springmount Vibrating Conveyor provides not only low initial cost, but later savings in operation and maintenance!

These conveyors are job-proven to be rugged! Gentle, even hopping action up to 50' per minute, the standard 4" troughed pan will carry materials; sub-freezing to 500° F.—lump or fines—wet or dry—loose or packaged—dense or porous—malleable or brittle! Special pans are available for temperatures up to 1200° F. and for severely abrasive or corrosive materials.

Hewitt-Robins Springmount Conveyors are adaptable

... standard pan widths of 8", 12" and 18" are available in lengths from 10' and up, in standard easy-to-assemble prefabricated units . . . dividers, gates and intermediate discharge points allow flexible combinations on any conveyor operation . . . assured power-economy, in that one horsepower drives 100' of 8" pan, 80' of 12" pan or 60' of 18" pan!



Get more detailed information on the Versatile Springmount Vibrating Conveyor! Contact your nearest Hewitt-Robins agent or distributor . . . or write today to Dept. VC-1, Hewitt-Robins, Inc., Stamford, Conn.

H E W I T T  **R O B I N S**
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SHOW PREVIEWS

... Begins on page 77.

Powdered metallurgy

Kwikset Locks, Inc., will offer an 8-page folder describing mechanical advantages offered by powdered processes in Booth 381.

Measuring surface roughness

The Micrometrical Mfg. Co. plans to distribute a bulletin on their Profilometer, a direct reading shop instrument for measuring surface roughness, in Booth 707.

Cutting and welding tips

National Torch Tip Co. plans to display complete line of replacement cutting and welding tips, including many new tips for special applications, in Booth 937.

Automatic carbon controller

Natural Gas, Inc., will display a new surface combustion Autocarb automatic continuous carbon controller for continuous control of carbon potential of furnace atmosphere in Booth 527.

Stud welding

Nelson Stud Welding Division of Gregory Industries, Inc., plans to distribute two booklets: "Stud welding ferrous and nonferrous metals," and "The new Nelson NS-9," in Booth 226.

Deburring and chamfering

Nobur Mfg. Co. will offer a catalog describing a complete line of hole deburring and chamfering tools in Booth 833.

FOR TEMPERATURE CONTROL...

Call **POWERS**



One of many Powers-Controlled Plating Machines at Sunbeam

Sunbeam
CORPORATION ASSURES HIGH-
QUALITY VOLUME PRODUCTION
PLATING WITH POWERS
TEMPERATURE CONTROLS

Metal finishing operations at Sunbeam are critical. Volume production must be maintained on modern automatic equipment, yet every finished piece must be perfect. Sunbeam uses Powers Temperature Controls extensively to assure production and quality. Powers can help solve your Temperature Control problems. Contact our nearest office or write us direct.

(b74c)
Bulletin 330 Describes Controls for Metal Finishing

THE POWERS REGULATOR CO.
Skokie, Ill. • Offices in 60 Cities • See Your Phone Book

Over 50 Years of Automatic Temperature and Humidity Control



Fenway Nibbler

Fenway Machine Sales Co., Inc., will make available a folder on the Fenway Nibbler, designed to overcome sheet metal fabricating problems, in Booth 826.

Warehouser lift trucks

The Yale & Towne Manufacturing Co. plans to distribute literature on its Warehouser line as well as material covering all products manufactured by the company in Booth 910.

Alkaline rust remover

Oakite Products, Inc., plans to display Oakite ruststripper, CrysCoat iron and zinc phosphate treatments, electrocleaning, barrel finishing and drawing compounds; and materials for paint spray booth water treatment in Booth 680.

Brinell hardness tester

Steel City Testing Machines, Inc., will exhibit a new "Color-Glance" Brinell hardness tester, a ductility testing machine, a Flex-Tester for testing drawing qualities, and others in Booth 278.

Measuring and testing instruments

George Scherr Optical Tools Co. will exhibit its optical dividing head, Leitz Perfectionometer, vertical measuring machine, toolmakers' microscopes, and Wilder micro-projectors in Booth 526.

Industrial cleaning equipment

Detrex Corp. plans to feature a Rotary-Gyro degreaser which uses a modified ferris wheel principle to produce rotation and translation of work baskets or individual pieces in fixtures, in Booth 409.

Portable x-ray unit

General Electric Co. will show a new type of portable industrial x-ray unit capable of producing a 360 deg. radiation sweep, which enables radiographers to attain new highs in inspection efficiency, in Booth 359.

Hydraulic extrusion press

Harvey Aluminum, division of Harvey Machine Co., Inc., will display a working scale model of a 12,000-ton hydraulic extrusion press in Booth 382.

Frozen mercury process

Kolcast Industries, Inc., will distribute a brochure explaining the use of the Kolcast frozen mercury process for difficult design problems in Booth 749.

Distributors of

MANHATTAN ABRASIVE PRODUCTS

Specializing in

WISE CUT OFF MACHINES & WHEELS

For the Cutting of

STRUCTURAL SHAPES - PIPE - STEEL - ETC.

PROMPT DELIVERY ON SHIPMENTS

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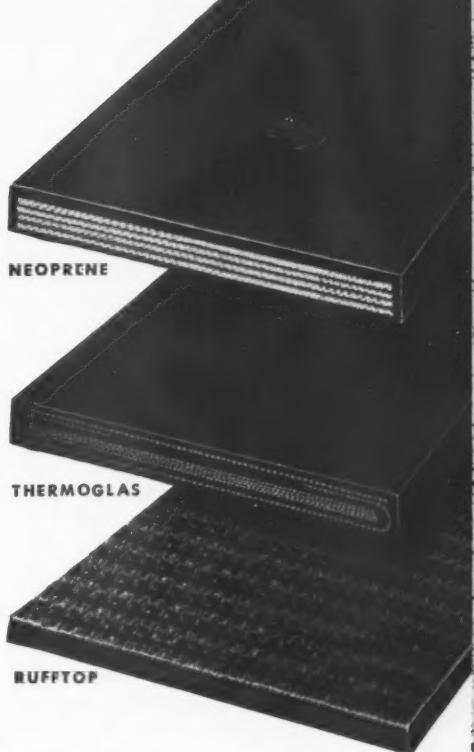
See us in Booth 651, Western Metal Exposition



Thermoid Conveyor Belting cuts your handling costs

There's a Thermoid Conveyor Belt designed to lower your costs on every type of materials handling job. Each is best suited for the particular type of service recommended. Here are 3 selected from the complete Thermoid line: **NEOPRENE**—built especially for conditions where heat and oil are encountered; **THERMOGLAS**—designed for use where belt is exposed to temperatures of 275° to 350° F.; **RUFFTOP**—Thousands of irregular gripper points guide smooth surfaced articles up inclines to 35°.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life, less down time, lower handling costs. Your Thermoid Distributor carries a full line of Thermoid Conveyor Belting, Hose and Multi-V Belts to meet your most exacting requirements. He maintains complete stocks and can give you fast service. If you prefer, write direct.



Thermoid
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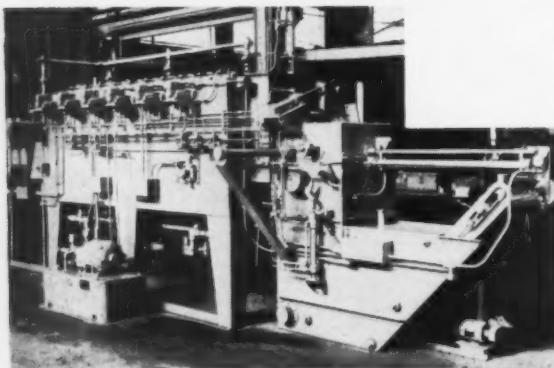
Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah

NEW EQUIPMENT AND MATERIALS

FOR YOUR CONVENIENCE the company address follows each item.

High production with new furnace



Gas-fired vertical radiant tube hydraulic pusher production carbonitriding and gas carburizing furnace eliminates operator error because of its automatic pushing sequence. Operator merely sets cycle timer for desired pushing interval, and when timer rings a bell, he places a loaded basket on front loading table, depresses a manual pushbutton, and automatic sequence begins. Each piece is individually quenched, and work is never removed from protective atmosphere until it emerges from quench. Heating is by means of 20 radiant tubes, 10 per zone. Total input rating is 1,630,000 Btu./hr., 815,000 in each zone. Furnace pictured is 18 in. wide by 9 ft. long. *Lindberg Engineering Co., 2450 West Hubbard St., Chicago 12*

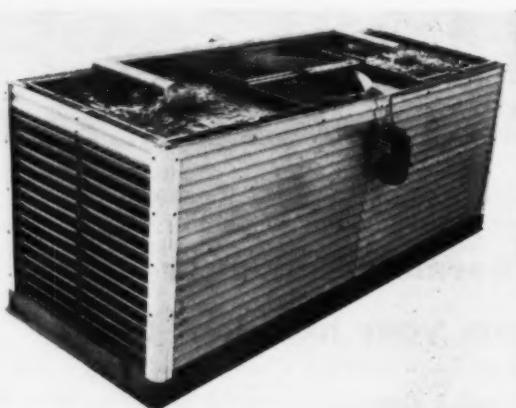
Special properties in silicone rubber

New W-96 silicone gum has "controlled reactivity"—which, according to manufacturer, describes the process of incorporating a controlled number of reactive groups into each silicone molecule. These reactive groups determine final structure of cured rubber. This property, inherent in gum stock itself, is said to make unnecessary many special compounding and curing techniques. Physical properties include low compression set, which is present over a wide range of hardnesses, and good resistance to high-pressure steam. Manufacturer offers physical data for numerous W-96 compounds to companies interested in exploring potentials of this new material. *Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17*

Heart of steel

Armco Aluminized steel (Type 2) is said to combine corrosion-resisting and heat-reflecting qualities of aluminum with the strength of steel. This new product, as well as Armco Type 1 (developed in 1939), is made by applying molten aluminum to cold rolled sheet steel by a continuous pre-treatment and immersion process. General reaction to atmospheric exposure is same as solid aluminum. Coefficient of expansion is said to be only half that of aluminum. Resistance to fire damage is better than aluminum or galvanized steel. Costs are generally lower than aluminum, with substantial savings in heavier gages. *Armco Steel Corp., Middletown, Ohio*

Lo-Line cooling tower



This newly designed induced draft tower is specially adapted for longer, lower-lined suburban-type buildings, and also for mounting on the roof of a metropolitan building, by providing a low silhouette which can be easily concealed. All fittings are on outside of tower, where they can be reached without ladders for maintenance and lubrication. Stainless steel fan shaft. Available in full range of sizes to handle air conditioning loads of 75 tons and up, and a variety of industrial cooling duties. *J. F. Pritchard and Co., 908 Grand Ave., Kansas City 6, Mo.*

RUBBER PRODUCTS for industry

**Molding, Specialties, Solids, Roll Covering Pipe Lining,
Tank Lining, Coatings, Custom Work**

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WESTERN INDUSTRY — March 1955

UNITED STATES STEEL AT WORK IN THE WEST—Metallurgical Science serves steel customers



HE CAN SAVE YOU MONEY...by knowing Steel

"You can switch to a less expensive grade steel" advised the Metallurgist, "without affecting the quality of your product". Listening was a manufacturer of porcelain-on-steel bathtubs. And elsewhere in the West, other users of United States Steel are similarly profiting from the many free services of skilled USS Metallurgical field representatives. These men specialize in helping customers get more for their money from steel... *United States Steel.*

Yesterday, Today, and Tomorrow—Columbia-Geneva has for years helped to fill the steel needs of the West. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer
United States Steel Corporation • Columbia-Geneva Steel Division

SAN FRANCISCO • LOS ANGELES • PORTLAND • SEATTLE • SALT LAKE CITY • DENVER



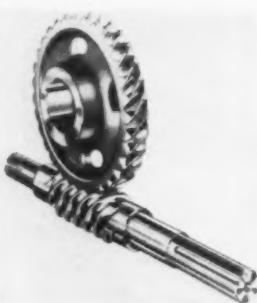
UNITED STATES STEEL

NEW EQUIPMENT

... Begins on page 92.

Standard line of worm gear sets

Previously manufacturing worm gear sets for inclusion in its own reducer units, Foote Bros. has cataloged a standard line for applications in cranes and hoists, machine tools, furnace drives, metal mills and other equipment with shock load or uniform load characteristics. Worm gear sets are available in standard ratios from $4\frac{1}{8}$ to 71. *Foote Bros. Gear and Machine Corp., 4545 So. Western Ave., Chicago 9*



Powder removes rust, scale, and paint

Kelite Process 235 is dry powder which in water solution removes hard water scale, rust, and paint from ferrous metals. At concentration of 3 lbs. per gal. at temperatures of 180 to 212 deg., powder assures virtually complete removal of rust in 30 to 40 minutes, the company states. No electrolytic current is used and the material is non-acid. Lead, zinc, and aluminum are subject to deleterious attack, but rate of attack on copper is low. *Kelite Products Inc., 1250 N. Main St., Los Angeles 12*

when you buy...

**EPOXY
TOOLPLASTIK**
(For Fiberglass Tooling)

it should add up!

EXPERIENCE
SINCE 1938... Proven Plastics for Tooling

+ SERVICE
Trained Field Engineers solve your problems... no cost to you.

+ PRODUCT DATA
As well as Technical Data published to keep you informed.
New Brochure and Handy Use Guide mailed free upon request.

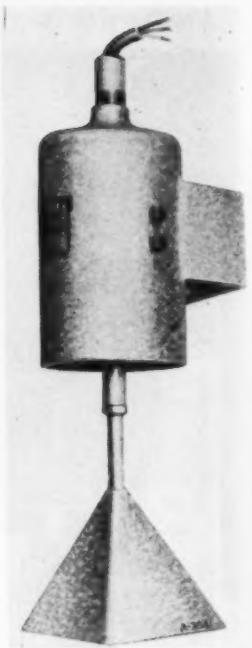
**REZOLIN
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DETROIT • DALLAS • NEW YORK
EPOXY RESINS • PHENOLICS • CORFOAM
DYFORM • SUPPORTING PRODUCTS

See us in Booth 923 at Western Metal Exposition

New bin level control

Improved type heavy duty Tellevel bin level control has redesigned switch housing and deflector mechanism to reduce sticky material building up on unit. Pendant steel cone deflector has been replaced by a steel pyramid. Switch housing is one piece unit of spun steel tapped at one end for electrical conduit and sealed at other end by molded rubber grommet. *Stephens-Adamson Mfg. Co., 2227 E. 37th St., Los Angeles 58*

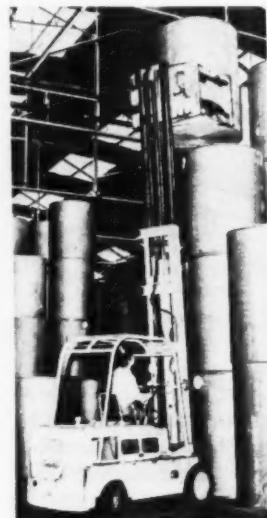


Truck size tubeless tires

Available in 6.50-16 6-ply size is the new tubeless, puncture sealing commercial truck tire by Goodrich. Employing a grip block tread which assures skid protection, the tire can be mounted only on drop center rims. Tires can be repaired and recapped using conventional methods and equipment. *B. F. Goodrich Co., 5400 E. Olympic Blvd., Los Angeles 22*

Rotating roll clamp

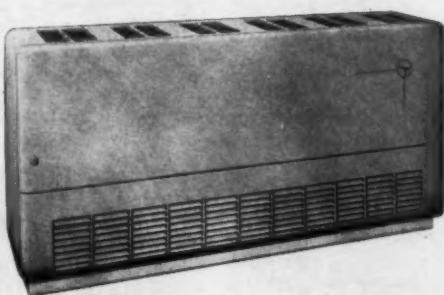
New 90 degree rotating roll clamp handles from 36 to 60 in. diameter, with optional provisions from 12 to 36 in., and when mounted on Clark's Utilitrac-100, clamp tiers 6,000 lb., rolls four high. Clamp is hydraulically operated, with two clamping cylinders exerting total pressure of 12,000 lb. Single cylinder which develops torque of 106,000 in.-lb. is used for rotation. *Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.*



Heavy duty industrial flashlights

Two new heavy duty industrial flashlights have been announced by National Carbon Co. Eveready Heavy Duty flashlight has insulated ethyl cellulose case that withstands deterioration from water, oils, or chemicals. Hand replaceable insulated slide switch and lens guard of polyethylene for red safety light are also featured. Eveready Safety flashlight has same features plus extra lamp in bottom cap and filament that snuffs instantly if lamp is broken. *Union Carbide and Carbon Co., 30 E. 42nd St., New York 17*

New in style and color



Advantages of new Herman Nelson line of console heaters are reported to be a removable base for wall-hung units; new key-operated two-speed key switch operated through the grill, removing need for an access door; one-piece front panel for fully recessed applications; and easy access to all parts by removal of key-operated screws on front panel. Units are available in Nelson gray and seven other colors, as well as two-tone designs. *American Air Filter Co., Inc., Louisville 8, Ky.*

New Aircosil alloys and flux

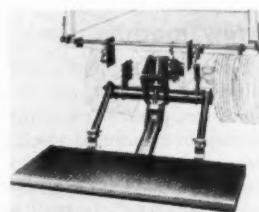
Silver brazing alloys and flux are available in rod, wire, sheet, rings, gaskets and special shapes from Aircosil. Special composition alloys for any production requirements are also available. Silver brazing flux is in paste and will not freeze, crystallize or separate. Company states that bonds are liquid and gas tight under heavy pressures, with strength and ductility enabling them to withstand intense shock, vibration, and extreme temperature changes. Aircosil joins practically all ferrous, non-ferrous and dissimilar metals and alloys with melting points above its free-flowing temperatures. *Air Reduction Pacific Co., 220 Bush St., San Francisco*

Fingertip reverse in Speedwrench

Manufacturer claims that fingertip reverse in handle of new Thor Speedwrench, No. 55, permits more rigid armature support to develop extra power and longer motor life and permits solid rear end construction. Wrench is rated for standard capacity of $\frac{3}{8}$ in. bolt size nut setting, with extra capacity of $\frac{5}{8}$ in. Tool is designed for standard $\frac{1}{2}$ in. square drive wrench sockets and may be adapted for driving square end taps, round shank drills, reamers, wire brushes and other accessories. *Thor Power Tool Co., Aurora, Ill.*

Safe elevating end gate

Safety features on a new Gar Wood elevating end gate include a dead man control, an overload valve and a safety valve preventing closing when platform is loaded. Gate is for installation on rear of $1\frac{1}{2}$ ton or larger truck or semitrailer. Full power operation for easy loading and unloading and simplified, compact construction are features claimed. *Gar Wood Industries Inc., Wayne, Mich.*



If you use bolts and lock washers for fastening assemblies...here's a suggestion for saving time and money. Substitute Reliance Springtites and Sems. You can reduce manual fastening time by $\frac{1}{2}$ and multiply efficiency by 2.



THIS IS WASTE MOTION



THIS IS EFFICIENCY

Savings result from the one piece design of these Reliance fasteners. By making the lock washer an integral and functional part of the bolt, production workers eliminate the steps of picking up a lock washer, slipping it in place and holding it until the piece is fastened. Production costs drop.



"SPRINGTITE" AND "HOZ-FAS-NER" ARE REGISTERED TRADEMARKS OF THE EATON MANUFACTURING COMPANY.

EATON MANUFACTURING COMPANY



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Are you looking for better methods for stripping paint?

Do some finishes resist your present stripping methods? Do rejects form a bottleneck in your production line?

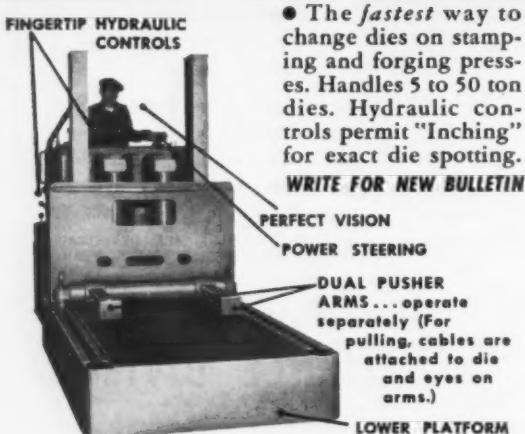
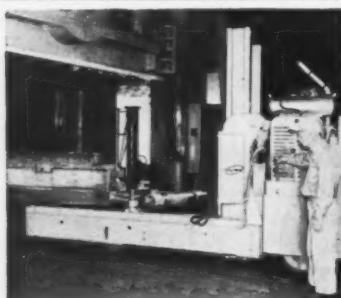
Oakite's FREE booklet on "How to STRIP PAINT" will help you find more efficient procedures. You'll want to read more about: The best way to strip parts too large to be soaked in tanks (see page 3); The best way to strip large areas of structural metal (see page 5); What strippers are best for oil-base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas (see page 12).

FREE For a copy of "How to STRIP PAINT" write to Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.



Technical Service Representatives in Principal Cities of U.S. and Canada

See us in Booth 880 at the ASTE Show and in Booth 680 at the Western Metal Exposition



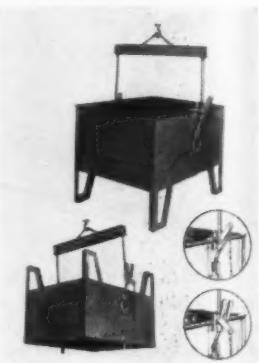
ELWELL-PARKER ELECTRIC CO. WESTERN REPRESENTATIVES:
Los Angeles . . . J. W. LAFFERTY CO., 5422 E. Washington Boulevard
San Francisco . . . IRA G. PERIN CO., 575 Howard Street
Seattle . . . COLBY STEEL & MFG. INC., 3155 Elliott Avenue

NEW EQUIPMENT

. . . Begins on page 92.

Gravity latch for automatic dump box

Here is a dump box for handling all types of materials and parts, suitable for use with hand, power lift, or fork truck, as well as overhead hoist. Gravity latch locks box in upright position until ready for dumping. Heavy gage steel with reinforced flange around top edge and reinforced plate at location of trunion. Box 48 in. long, 36 in. wide, and 24 in. deep inside, or built to specifications. *Palmer-Shile Co., 12667 Mansfield, Detroit 27, Mich.*

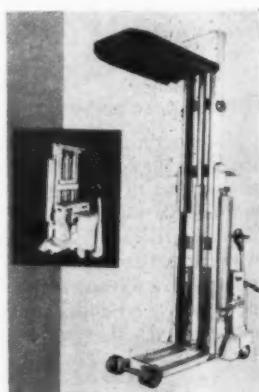


VHS (very high strength) rope

Special precise analysis high carbon steel wire and improved processing have gone into this new wire rope product, which has an average tensile strength of 300,000 psi.—at least 15% stronger, manufacturer states, than other wire rope now manufactured. It is already being used by Navy for steam jet catapult launching assemblies, and has been tested in construction, mining, petroleum, and logging installations, with more than double ordinary service life. Now available in diameters from $\frac{1}{2}$ to 2 in. *American Chain and Cable Co., Inc., 929 Connecticut Ave., Bridgeport 2, Conn.*

High lift platform

New "K" hydroelectric hand motorized high lift platform truck is off the production line, available in 2,000 and 3,000 lb. capacity. Mast assembly is telescopic with roller type construction, having lifts of 60, 108, and 120 in. Platform is 7 in. lowered height minimum, 24 and 26 in. wide, lengths from 36 to 60 in. Truck features Dyna Dual power unit. *Lift Trucks, Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio*

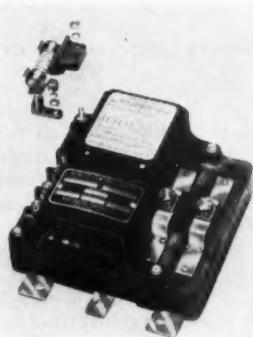


Screw machine stock guide

Slide-rule type calculator is designed to aid screw machine stock buyers and operators in making estimates on aluminum parts stock requirements. Device instantly gives amount of aluminum stock needed for 1,000 parts with dimensions from $\frac{1}{4}$ in. to 3 in. length and $\frac{1}{8}$ in. to $\frac{3}{16}$ in. diameter. Calculator also gives pounds-per-foot, feet-per-pound and fractions-to-decimal equivalents for round and hexagon aluminum stock from $\frac{1}{8}$ in. to 8 in. Another table lists mechanical properties for aluminum stock. *Industrial Service Division, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.*

New feature in remote control switch

Bulletin 920 remote control switch is now available with a control line fuse and adapter, which can also be purchased separately and added to already installed switch. Bulletin 920 switch, actuated by push button, timer, toggle switch, or similar devices, provides accessible control of lighting and power circuits. *Automatic Switch Co., 391 Lakeside Ave., Orange, N.J.*



Quick on the trigger

Three trigger-release portable plier-type toggle clamps are added to DE-STA-CO line of toggle clamps. Trigger-action enables operator to hold work with one hand and clamp and release with the other. New models are designated 482, 484, and 486, and are stocked nationally by DE-STA-CO dealers. *Detroit Stamping Co., 340 Midland Ave., Detroit 3, Mich.*

Lowe automatic grinder

Automatic grinder standardizes quality of grinding by machine-regulated pressure, according to Wallace Lowe, designer of this new machine. Since the swing-grinder must apply constant physical pressure in "skinning" a billet, results from that method depend on operator's skill, stamina, and temperament. Volume of production, it is claimed, triples with automatic grinding, and superior safety features protect operator. *Crucible Steel Co. of America, Oliver Building, Pittsburgh 22, Pa.*

Speedlift portable conveyor



Portable power belt conveyor raises and lowers independently at either end and adjusts from either right or left side to a 30 degree incline, with each leg separately adjustable. Maximum horizontal position is 61 in., with minimum of 22 in. from ground. Makers state that one man can move and adjust the lightweight conveyor. Features include positive belt tracking, controls at both ends, capacity of 500 lbs. horizontal and 350 lbs. at an angle. *Speedways Conveyors, Inc., 202 Rhode Island St., Buffalo, N.Y.*

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It is now possible, with the Arwood investment casting process, to economically produce shapes impractical to obtain by conventional methods. Often, many assemblies can be combined into a single casting, using unmachinable alloys. Applications are virtually unlimited.

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CASE STUDY

DESIGNATION: Aircraft emergency door latch.

METAL: Stainless steel 410 (AMS 5350).

PARTS: Designed and cast as a single unit.

QUALITY CONTROL: Produced under X-ray control. Chemical and physical affidavits furnished. Test bars submitted.

ADVANTAGES: Investment casting, by eliminating all finishing operations except reaming of cast hole through pivot boss, reduced cost from over \$10.00 each to approximately \$3.50 each.

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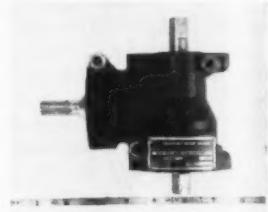
1423 W. Carroll Ave., Chicago 7, Ill.
Sales Engineers in San Francisco, Los Angeles and Portland

NEW EQUIPMENT

Begins on page 92.

T-boxes and angle drives

Model 1799E2 T-box is one of Western Gear's series of high-precision high-torque T-boxes and angle drives. This model is rated at 1,000 in. lb. torque at 20 rpm. and 400 in. lb. torque at 40 rpm. Maximum static torque is 1,200 in. lb. Unit has been life-cycled up to 12,000,000 revolutions. Lubricated for life of unit. *Western Gear, Lynwood, Calif.*

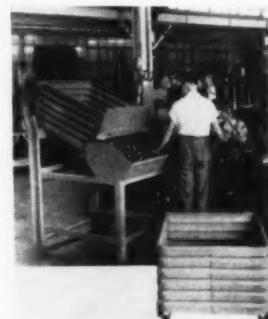


New wire rope for Roebling

New steel-core wire rope line in sizes ranging from $1\frac{1}{4}$ to $3\frac{1}{2}$ in. not only has higher strength, said to be 15% greater than previous strong grades, but also longer rope life due to high resistance to wear from bending and abrasion. Applications suggested are use on shovels, draglines, wagon-scrapers, all types of earth-moving equipment, rotary rigs, cat arches and chokers, slushers and mining machines, hot-ladle cranes and dredges. *John A. Roebling's Sons Corp., Trenton 2, N.J.*

"Flow-matic" hoppers and dumps

New line of materials handling units is designed for mass-production plants. Basic unit is box with guillotine-type door, which opens automatically as fork lift sets box on stand. Finished parts go into receiving box in foreground. Other units include double-size hopper box, rollovers, and funnel boxes. *Powell Pressed Steel Co., Hubbard, Ohio*



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250-ton press built in West

New addition to line of Multi-Max punch presses is giant 250-ton Diamond press. Features are: air disc clutch and air brake; adjustable column bearings; air counter balanced; twin drive by two bull gears; integral cam for each gear in lieu of crankshaft; electrical controls of single cycle or continuous run; operation in either direction; bed areas adjustable; capacities, if desired, up to 500 tons. *Diamond Machine Tool Co., 5111 Coffman-Pico Rd., Pico, Calif.*



Portable belt conveyor

Standard line of utility belt conveyors is now adapted to portable use by means of portable and fixed support arrangements. Present standardized lengths of 5½, 8, 10, 13, and 15 ft. are manufactured in belt widths of 10, 14, 16, 20, and 24 in. All-steel construction for standard units; light-weight applications make use of aluminum sub-assemblies. Individual units can be used to move boxes, cartons, or sacks from dock to truck or from floor to stack, or can be integrated with portable roller or wheel conveyor system to meet particular needs. *Standard Conveyor Co., North St. Paul 9, Minn.*

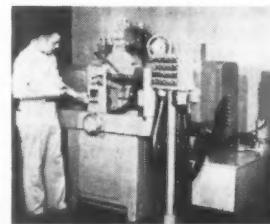
Automatic dumping attachment

Hydraulically powered attachment, which can be used with both electric and gas powered trucks, permits automatic end dumping of skid boxes. Double-acting hydraulic cylinder controlled by plunger type valve operates auxiliary tilting platform. Rear of platform is raised to dump load from open-end skid box or special rack. Suitable for movement of scrap, castings, wood pulp, and other materials. *Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.*

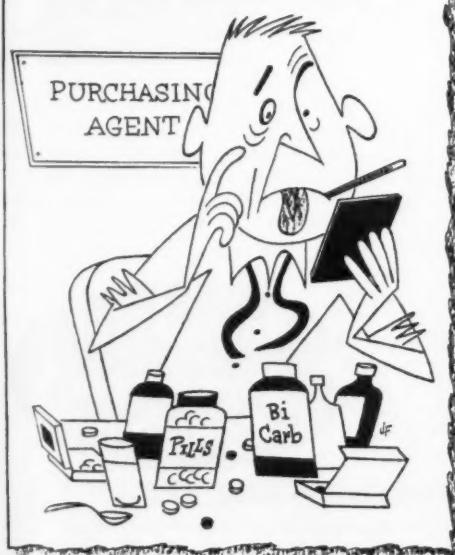


Automatic plunge grinder by DoAll

Rotor grinder, for slots in vane-type rotor pumps used in power steering and braking, utilizes basic DoAll grinder design but incorporates automatic fixturing to handle these parts. Machine holds to surface finish of 5 to 10 micro-in. RMS, and grinds 1,000 slots per hour. To maintain constant temperature of parts, heat-exchangers are used in coolant system. *The DoAll Co., 254 North Laurel Ave., Des Plaines, Ill.*



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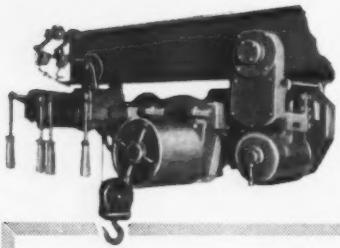
Suppliers are like doctors—when you need them you usually need them in a hurry. And just about the quickest way to find a local supplier is to flick through the Yellow Pages of your local telephone directory. Is it any wonder then that 9 out of 10 people use the Yellow Pages to find the local folks who serve or sell? So, when you're sick and tired of supplier problems, take this prescription: Check the "Classified".

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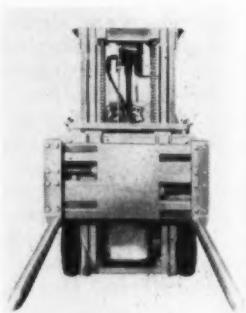
See our exhibit at the Western Metals Exposition in Los Angeles March 28 thru April 1—Booth 850

NEW EQUIPMENT

... Begins on page 92.

Squeeze play

New squeeze clamp attachment for fork lift trucks has special round forks 33 in. long and egg-shaped on the ends, which close up to a minimum of about 18 in. and open up as far as 55 in. In handling textile materials, round forks cradle the load; they can also be used to pick up square bales or rolls by squeeze method, or can serve as regular forks for handling pallets in usual way. *Logson Mobilift Corp., Portland, Ore.*



Phosphor bronzes called Duraflex

Anaconda's new fine-grain phosphor bronzes will be marketed under trade name Duraflex. Bronze will be available in sheetmetal thicknesses up to .062 in. and in wire diameters to 3/16 in. Company claims laboratory tests show 30% increase in endurance limit for the hard temper phosphor bronze over conventionally produced bronzes. Another advantage claimed is that with any given tensile strength, formability is increased with no sacrifice in yield strength or proportional limit. *American Brass Co., 25 Broadway, New York 4*

Standby power for industry

New Onan Model 75HR is a 75 kw., 93-75 kva. emergency electric generating plant specially designed to provide efficient electric motor starting. Plant is powered by Continental 6-cylinder gasoline engine. Onan-built generator is of alternating current revolving field type, externally voltage regulated. Generators are designed to permit parallel operation, providing dependable continuous service for construction projects, lumber camps, and similar duty. *D. W. Onan & Sons, Inc., Minneapolis 14, Minn.*



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HELPFUL LITERATURE

FOR YOUR CONVENIENCE the company address follows each item.

Arizona manufacturing directory

A complete directory of Arizona manufacturing establishments—first of its type ever compiled—lists plants, together with their principal officers, products, and number of employees, by subject and community. Directory is available from *Valley National Bank, Publicity Department, 303 Security Bldg., Phoenix, Ariz.*

Treating boiler makeup water

This new bulletin points out that since no external treatment system produces complete removal of objectionable materials from makeup and since contamination usually exists in condensate, further chemical or supplementary treatments are advisable. Description of Allis-Chalmers No. 40 series supplementary water treatments and their uses are given. *Allis-Chalmers Mfg. Co., 1088 70th St., Milwaukee 1, Wisc.*

Heli-Coil screw-lock insert

Revised Bulletin 715-B contains selection tables and complete instructions, including line drawings showing proper installations in blind and through holes, for the newest screw-lock insert offered by Heli-Coil Corp. The screw-lock insert features a constricting bottom coil which applies a strong gripping force on end threads of the screw or stud, eliminating the need for lock-washers, lock-nuts, and lock-wires. The locked screw or stud may be readily freed by applying breakaway torque approximately equal to the torque applied in making the original assembly. *Heli-Coil Corp., Danbury, Conn.*

Split bearings

A 24-page illustrated brochure tells what a split bearing is and enumerates its advantages. Also included are load capacities, design limitations, mounting procedures, and specifications for split bearings. For your copy write *Split Ballbearing Corp., Lebanon, N.H.*

Aluminum for building

This booklet showing industrial roofing and siding, industrial flat flashing stock, fasteners, and preformed accessories is intended to provide an answer to builders' demands for more attractive, modern looking, low cost industrial building products. *Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.*

Super refractories

A new 24-page booklet gives latest physical and chemical properties on super refractories. These are augmented by lists of applications together with pertinent charts and tables. Obtainable from *The Carborundum Co., Refractories Div., Perth Amboy, N.J.*

Dual-purpose fork truck attachment

This single-page bulletin tells about clamping forks with drum up-enders for increasing versatility of fork truck operation. "What it does" and "how it works" are described in general, supplemented by construction details and diagram. *Lewis-Shepard Products, Inc., Dept. R-66, Watertown 72, Mass.*

Thermal properties of rubber

Three important thermal properties—thermal conductivity, coefficient of expansion, and Joule effect—are described in Neoprene Notebook No. 62. Also described are neoprene hose, coatings, and other products. *E. I. du Pont de Nemours & Co., Rubber Chemicals Division, Wilmington, Del.*

Low pressure cylinder catalog

Nopak Division of Galland-Henning Mfg. Co. offers Catalog 101 in first step to recatalog its various lines of air or hydraulic cylinders and valves. This catalog covers low pressure cylinders to a maximum of 650 psi. *Galland-Henning Mfg. Co., 2753 S. 31st St., Milwaukee, Wisc.*

Torque converter catalog

An 8-page four-color catalog describing Clark Equipment Co.'s line of Torcon torque converters depicts models, shows attachments for specific adaptations, and describes, with cut-away drawings, construction of the converters. *Clark Equipment Co., Transmission Div., Falahee Road, Jackson, Mich.*

Induced draft cooling towers

This attractively illustrated cooling tower booklet covers the Pritchard line for industrial and air conditioning applications from redwood tree to company guarantee. The booklet is organized into 15 questions and answers about cooling towers in general and the company line in particular. *J. F. Pritchard & Co. of California, 4625 Roanoke Parkway, Kansas City 12, Mo.*

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HELPFUL LITERATURE

Steel line described

A 12-page pamphlet containing technical data sheets on Allegheny Relay Steels and including information on applications, magnetic properties as indicated by graphs of hysteresis loops and magnetization curves, and physical properties, is available to all interested parties. *Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.*

Barrel finishing

A new instructional booklet on barrel finishing has been released by the makers of Honite brand barrel finishing chips, compounds, and equipment. The 10-page manual describes the basic steps involved in making trial processing runs, and makes recommendations for selection of media and compounds, as well as for barrel speeds, water level, time cycles, and barrel loading. Available from *Minnesota Mining & Manufacturing Co., Dept. A5-7, 900 Fauquier St., St. Paul 6, Minn.*

Lift truck specifications

A folder describing a new Colson Handler gasoline powered, rider-type lift truck includes photographs and complete performance data as well as the truck specifications. Principal operating feature is single lever control. Photographs of other types of material handling equipment are included. *The Colson Corp., Elyria, Ohio*

Stainless steel meters

A new booklet describing the design and operation of a new line of Rotocycle stainless steel industrial meters for specific applications in the food, chemical, petro-chemical, industrial, pharmaceutical, and processing fields is offered by Rockwell Manufacturing Co. Also described are two types of accessory equipment for use with the meters: remote registration equipment for centralized batching and flow control, and multi-stage quantity control valves to eliminate hydraulic line shock from abrupt shut-off. For a copy of Bulletin O. G. 406, write to *Meter and Valve Division, Rockwell Manufacturing Co., 400 North Lexington Ave., Pittsburgh 8, Pa.*

Materials handling seminar

A materials handling seminar aimed at cutting industry's hundreds of millions of dollars of yearly loss attributed to poor handling methods, will be held June 19 to July 2 at Lake Placid, New York. The aim of the Conference is to provide a practical how-to-do-it training program for company executives on a middle management or staff level. For a copy of this booklet describing the seminar, write *Annual Material Handling Training Conference, 56 Robbins Road, Lexington, Mass.*

Index for copper and alloys

An easy to use, 24-page reference manual containing the latest copper and copper alloy specifications includes ASTM, ASME, AWS, SAE, AMS, Federal, Military, Army, Navy, and Joint Army-Navy specifications. The first listed are most generally used alloys with applicable specifications; a second part contains brief description of material as to alloy, grade, type, temper, anneal, etc. Publication B-34R; *The American Brass Co., Waterbury 20, Conn.*



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Guide to fastest machining steels

Relative machinability (using B-1112 as standard) of fast-cutting carbon, alloy, and stainless steel is compared in a new bulletin which also summarizes for quick reference other principal characteristics of some 17 different analyses. Leaded carbon and alloy steels, newest and fastest machining in the free-cutting group, are included in the comparative study. Write to *Joseph T. Ryerson & Son, Inc., Box 188, Emeryville, Calif.*

Retaining ring supplement

An 8-page supplement to Waldes Truarc retaining ring catalog No. RR 9-52, designated Supplement No. 1, contains revisions, corrections, additions, and new product developments. Two pages are devoted to engineering data and specifications covering use of two internal rings (series 5000 and 5008), and two external rings (5100 and 5108) in deeper grooves than those specified in the catalog. Write *Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City, New York.*

Doors for industry

Illustrated by 20 typical installations, this catalog provides facts, figures, and planning data on new developments in doors for hangars, warehouses, piers, and other buildings. Hangar door types featured are: telescoping canopy, turnover canopy, low headroom braced canopy, bifold canopy, straight slide, and around the slide doors. Write to *International Steel Co., Evansville, Ind.*

New process

A neatly arranged folder describes the Kanigen electroless nickel process, employing a chemical reaction and offering the designer increased freedom to employ plating in applications where it could not previously have been used. Process allows intricate shapes of practically any size and in wide range of basic materials to be custom plated to a precisely controlled, uniform thickness on all surfaces. *General American Transportation Corp., 135 South La Salle St., Chicago 90, Ill.*

Bagging scale

Richardson Scale Co. offers a product data sheet on its improved GGG-38 bagging scale, a mechanically-operated weighing unit that has been equipped with a synchronized belt feeder and a pneumatic inlet-gate assist. Both of these enable the scale to operate faster and handle lumpy materials while adding only 25 lb. to the weight. Also included are seven specifications, five features, photograph of the unit, and a dimensioned engineering drawing. Ask for Product Data Sheet No. 5401. *Richardson Scale Co., Van Houten Ave., Clifton, N. J.*

Plastisols and plastics

B. F. Goodrich plastisols and liquid vinyl plastics are described in a new data sheet along with the most common products made from these materials: toys, novelties, film packaging materials, protective coating, luggage, gloves, wire coverings, plating racks, tubing, and gaskets. Plastisols are described as completely compounded, ready-to-use materials that can be made into finished products by dip-coating, spread-coating, casting, slush molding, and other processes. *The B. F. Goodrich Co., 5400 E. Olympic Blvd., Los Angeles 22, Calif.*

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Positive sprocket tooth drive distributes chain stresses to assure straight line pull.

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Metallurgical research and inventive engineering have reduced bulk and weight . . . eliminated fast wearing parts to assure dependable operation with minimum maintenance.

Because of these and other revolutionary features incorporated, Chainveyor has created an unprecedented amount of interest in the Materials Handling market.

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At the Chainveyor Corporation's Booth No. 170 you will find—in actual operation, a complete Chainveyor System one hundred eighty feet in length. The exhibit will exemplify, first hand, the many revolutionary features incorporated in this new low cost overhead conveyor.



See us in Booth 170 at the
Western Metal Exposition

HELPFUL LITERATURE

Relay selection tabulations

This publication, No. 553, tells how to select a magnetically or mechanically held relay. Also supplied are circuit diagrams for 2-wire control, stop-start 3-wire maintained control, and thermostatic control magnetically held relays. *Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.*

Electrodes for arc welding

Complete new set of literature, designed to help welding engineers and others concerned with production and maintenance welding, describes the entire line of Murex electrodes for arc welding as well as rods and wire for gas, submerged arc and inert arc welding. Full information including physical properties, chemical analyses, qualifications, procedures, sizes, and general engineering data is contained in each catalog. *Write Metal & Thermit Corp., 100 E. 42nd St., New York 17*

Vertical pumps

Peerless industrial service pumps, described in a new 16-page bulletin, are being offered in three basic production designs: standard service type, heavy duty service type, and a special service type for pumping hydrocarbons, volatile liquids, chemical solutions, and other process liquids. Design details and materials of construction of each type vary to meet the specific conditions to which these pumps are applied. *Peerless Pump Division, Food Machinery and Chemical Corp., 301 West Avenue 26, Los Angeles 31, Calif.*

Standardized press application

A folder containing reference material pertinent to a new standardized press application is offered to users and manufacturers of open back inclinable and straight side presses. Application features Fawick Airflex clutch and brake in a completely packaged arrangement, including a new flywheel mounted on anti-friction bearings, components, and electro-pneumatic controls. For more information write to *Fawick Airflex Division, Fawick Corp., 9919 Clinton Rd., Cleveland 11, Ohio.*



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Overhead crane booklet

A booklet entitled "Presenting Whiting Engineered Cranes" shows the wide variety of handling jobs being performed by these cranes in foundries, railroads, power plants, steel mills, and general industry. Among important features cited are: Selectodyne control for precision control of both heavy and light loads, a full vision cab for faster, safer crane operation, and improved braking equipment. *Whiting Corp., Harvey, Ill.*

Insulation booklet

This 8-page booklet contains description and illustration of various types of Fiberglas Aerocor insulation. These products have a low thermal conductivity and high sound absorption qualities, yet are light in weight, non-combustible, clean and easy to handle. Commercial uses include: insulation for hot or cold pipes, air ducts, metal buildings, furnaces, railroad cars, aircraft, trucks, trailers, and ships, etc. *Owens-Corning Fiberglas Corp., Toledo 1, Ohio*

Box car unloader

A folder describing the Stephens-Adamson box car unloader, equipped with automatic power scoop, indicates that cars can be unloaded on either of two tracks in approximately one-half manhour per car. The unit is designed for relatively free flowing bulk materials at plants which have unloading requirements exceeding the output of conventional hand-operated power shovels but do not require large rotary dump installations. *Stephens-Adamson Manufacturing Co., 2227 E. 37th St., Los Angeles, Calif.*

Forged steel unions

Bulletin U-1 describes forged steel unions designed to dimensional specifications of Association of American Railroads. They are drop-forged of highest quality carbon steel in accordance with ASTM Specification A-105, Grade 2. Complete dimensions of unions in sizes $\frac{1}{8}$ in. to 2 in. in 3,000 lb. class are presented along with outstanding design features which make unions highly desirable for high pressure services and for resistance to shock vibration and misalignment stresses. Write *Watson-Stillman Fittings Division, H. K. Porter Co., Inc., P. O. Box 95, Roselle, N. J.*

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Continuous Power
Chain Conveyor

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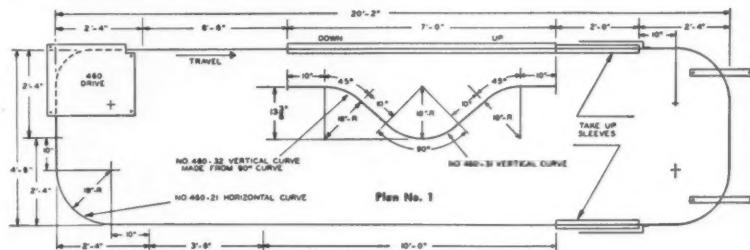
Richards-Wilcox' new "460" overhead conveyor can be installed without special engineering by your own plant personnel, quickly and easily, to meet your specific needs.

Completely packaged and shipped from stock, it offers economical and versatile light-load handling because of its lower load limits, flexibility, and easy installation.

R-W "460" is unequaled for jobs where the use of heavier conveyors

is impractical. It is particularly recommended as a supplementary unit on production lines, and to help simplify and speed production where drying ovens, washers, paint sprayers, de-greasers and similar operations are involved.

R-W "460" is available up to 200-ft. maximum lengths only, with capacities of $8\frac{1}{2}$ lbs. on 6-inch centers or 17 lbs. per lineal foot, and 200 lbs. draw-bar pull.



"460" Conveyors are shipped completely packaged, in convenient, easily-handled units, from stock throughout the U. S. Packages to fill any requirement up to 200-foot maximum length are immediately available from stock. For complete information and descriptive catalog, contact:

Diagram shows one of many different layouts possible with R-W "460" basic package. Up to maximum over-all length of 200 feet, variations are almost unlimited.



Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION

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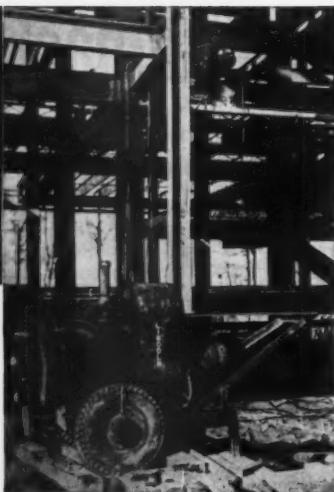
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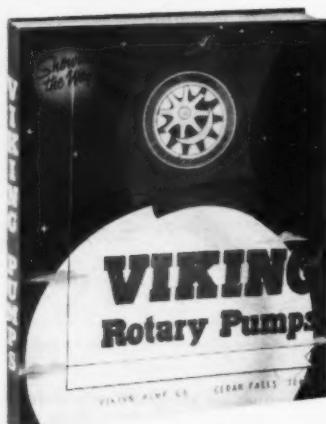
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Sling chain data book

A "how to do it" handbook on sling chains offers everything from how to order sling chains to their care, use, and inspection. The 32-page well illustrated handbook offers charts, diagrams, and tables on standard and special types of sling chains and attachments, and their sizes, weights, and working load limits under many conditions of use. Ask for Herc-Alloy Data Book No. 100. *Columbus McKinnon Chain Corp., Tonawanda, N. Y.*

Steel wall chart

Bethlehem Pacific's steel plants in Seattle, South San Francisco, and Los Angeles are offering a handy new wall chart listing weights and dimensions of rounds, strip and flats, angles, squares, universal mill plates, channels, tees, I-beams, and reinforcing bars. Sizes and weights per foot are also shown. *Bethlehem Pacific Coast Steel Corp., sales offices in Seattle, Spokane, Portland, San Francisco, or Los Angeles*

Engineering highlights of 1954

Westinghouse offers a 50-page booklet describing the company's technical endeavors during the past year. A few of the classifications cited are: steam turbines, gas turbines, turbine generators, power transformers, circuit interruption, relaying and protection, distribution, motors and drives, control, metal working, transportation, heating, welding and communications. Write to *Westinghouse Electric Corp., 410 Bush St., San Francisco 8, Calif.*

WESTERNERS AT WORK

ARIZONA

Reynolds Metals Co.

Harry E. Miller is new manager of company's aluminum extrusion plant at Phoenix, succeeding **Glenn Bakken**, now with Chase Brass and Copper Co., Inc., in Connecticut. Mr. Miller has been manager of Reynolds extrusion plant in Grand Rapids, Mich.

Phelps Dodge Corp.

Charles R. Kuzell holds new post of vice president of company, continuing in charge of Western activities. **Walter C. Lawson** is new general manager for Western operations. Both have offices in Douglas.

Stanford Research Institute

Carleton Green, former manager of SRI's area development research, is appointed manager of economics group, Mountain States division, with offices in Phoenix, Ariz. **Dr. William N. Breswick** joins that division as an associate economist, leaving the Southwest Research Institute.

CALIFORNIA

Tide Water Associated Oil Co.

T. O. Edwards is named manufacturing manager of company's Western division in Los Angeles. He succeeds **W. P. Hugo**, retired. His former post as general manager of company's refinery at Associated is now filled by **Oscar Larson**, formerly assistant general manager.



T. O. Edwards
Tide Water Associated Oil Co.

A. F. Hogland
Electronic Processes Co.

Electronic Processes Corp.

Alander F. Hogland joins this Los Altos company in post of general manager. He was previously in investment field.

S&W Fine Foods, Inc.

Frank J. Canonica, assistant secretary of this San Francisco company, is assigned additional duties of credit manager for Northern California division.

American Can Co.

R. C. Stolk succeeds **C. W. Roberts**, retired, as vice president in charge of company's Pacific division, San Francisco. Mr. Stolk has been division manager of sales for past two years. **T. A. Klabau** is appointed manager of company's Oakland plant, succeeding **Frank C. Davis**, who has transferred to Canco's Pacific division. From 1944 to 1954 Mr. Klabau was resident manager of company's operations in Honolulu. He has been with Canco for 24 years.

Thermador Electrical Manufacturing Co.

William K. Body is appointed assistant chief engineer in charge of refrigeration and air conditioning of this Los Angeles manufacturer. He has recently been manager of Kelvinator refrigeration research laboratory.

Hall-Scott Motors Co.



H. L. Lawrence **C. S. Herbert**
Hall-Scott Motors Co.

This Berkeley company appoints **Charles S. Herbert** as treasurer and vice president of finance, and **H. L. Lawrence** as vice president of manufacturing. **Z. P. Loyd** is named assistant to vice president of manufacturing. Mr. Herbert has been divisional comptroller and assistant treasurer for company, and was previously executive vice president and treasurer of Enterprise Engine and Foundry Co. Mr. Lawrence was formerly works manager and superintendent of production materials and control. Mr. Loyd has been with Hall-Scott since 1923, when he started as a machinist.

McDonald Bros.

Paul D. Eastman is named comptroller of this Los Angeles engineering and construction firm. He leaves Emerson Electric and Combustion Engineering Cos. in St. Louis, Mo.

National Supply Co.

Edwin S. Karlow adds new title of plant credit manager for industrial products division of company's Torrance plant, in addition to his present position of assistant division credit manager for California division.

Utility Fan Corp.

Vance Smith is named manager of all operations of this Los Angeles air moving equipment manufacturer. He moves up from post as assistant.

California Fish Canners Assoc.

Charles R. Carry is appointed executive director of this Terminal Island marketing group. He has been director of fishery products for National Canners Assoc.

McKinsey & Co.

Douglas Watson becomes a principal in the San Francisco office of this management consultant firm. **Forrest D. Wallace** becomes a partner and **Harry Rex Land, Jr.**, a principal in the Los Angeles office.

Waugh Engineering Co.

John M. Muhleman is named chief engineer of this Sherman Oaks manufacturing company.

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WESTERNERS AT WORK

Monterey Oil Co.

John R. McMillan is made executive vice president of this Los Angeles firm, which recently purchased Fullerton Oil and Gas Corp., which he headed. A. W. Gentry, also formerly of Fullerton, is named manager of field operation; D. P. Murdy, assistant to president; W. D. Stinson, assistant treasurer; and P. B. Mack, chief accountant.

Rohr Aircraft Co.

Hugh M. Rush is appointed laboratories manager for this Chula Vista aircraft manufacturer.

Rosenberg Bros. and Co., Inc.

Albert Arnold is elected president, Oscar Zebal executive vice president in charge of rice department, of this San Francisco packing company. Clarence C. Kane, former vice president-sales, and Joseph K. Kane, former vice president and assistant to president, resign.

Bethlehem Pacific Coast Steel Corp.

F. A. Norton advances to post of manager, commercial research, from that of research engineer. He has been in company's commercial research department at San Francisco since September 1953.

ElectroData Corp.

Richard E. Carpenter is promoted to chief production engineer of this affiliate of Consolidated Engineering Corp. in Pasadena. For the past year he has held post of staff assistant to vice president.

Stanford Research Institute

Dale H. Hutchison is appointed assistant chairman of chemistry department of this organization, which he joined in 1951. He will continue his work in field of air pollution. Dr. Richard D. Cadle heads new operation section on atmospheric chemical physics. Ashton J. O'Donnell, senior engineer, and Leroy A. Weller, senior economist, join staff of economics division. Mr. O'Donnell was formerly director of Technical Operations Division, San Francisco Operations Office, Atomic Energy Commission. Mr. Weller, a former sales engineer with Ingersoll-Rand Co., St. Louis, will assist in economic and marketing studies in SRI's Los Angeles office.

United States Steel Corp.



R. W. Seely R. E. Williams
Columbia Geneva Steel Div.

Ralph W. Seely is appointed vice president-sales of Columbia-Geneva Steel Division, to succeed M. J. Aurelius, who moves to Pittsburgh, Pa., as vice president and general manager of sales for United States Steel. Charles W. Lee replaces Mr. Seely as vice president and general manager of Consolidated Western Steel Division. R. E. Williams, who has been assistant to vice president, is named to post of assistant vice president-sales for Columbia-Geneva. James P. C. Dalrymple is appointed assistant treasurer of Consolidated Western, succeeding C. H. Lundquist, who has resigned to engage in other business activities.

Solar Aircraft Co.

Herbert Kunzel is elected executive vice president of this San Diego firm. He has been vice president, secretary, and manager of San Diego plant since he joined company's legal division in 1946. G. A. Johnston becomes purchasing agent at San Diego, succeeding R. W. Brick, who has resigned to become executive secretary-treasurer of Purchasing Agents' Assoc. of Los Angeles, Inc. Paul A. Pitt is named chief engineer, in charge of new engineering division which combines two former divisions, development engineering, of which he was formerly head, and design engineering. William C. Heath, former head of design engineering, is named executive engineer-marketing. Philip M. Klauber is appointed chief administrative engineer of San Diego plant, and is succeeded as director of public relations by Vice Adm. Wilder D. Baker, USN (Ret.).

Convair Division of General Dynamics Corp.

Company advances following men in its purchasing department at San Diego: Harold N. May, former chief of material, becomes general purchasing agent; W. G. Evans, staff assistant to chief of material, is named purchasing agent; Edward Fellows, Jr., who joined company in May of last year, becomes purchasing services administrator.

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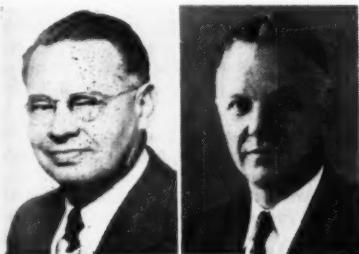
OFFICES IN PRINCIPAL CITIES

Plumb Tool Co.

New works manager of Los Angeles plant is *Henry W. Slininger*, who has been associated with several Midwestern manufacturers. *A. L. Hawley* is named chief engineer in charge of production and industrial engineering in Los Angeles.

Western Gear

John K. Morris is promoted to manager of engineering for company's six plants, moving up from position of supervisor of design engineering in Lynwood plant. He is succeeded in his former post by *Louis L. Acurso*. *Richard Hoard* is named general supervisor of project engineering for all plants.



J. K. Morris
Western Gear

H. H. Ahlskog
Earle M. Jorgensen
Co.

Earle M. Jorgensen Co.

Harold H. Ahlskog is named treasurer of this steel and aluminum distributor in Los Angeles. He has been with company since 1937.

Fibreboard Products, Inc.

B. R. Colkett is appointed vice president of this company, with headquarters in San Francisco. He is succeeded in his former post of secretary and treasurer by *J. S. Mitchell*, formerly assistant secretary.

Federal Pacific Electric Co.

This Newark, N. J., manufacturer appoints *Howard D. Tindall* manager of its transformer division, to include management of Gardner Electric Manufacturing Co., wholly-owned subsidiary in San Francisco.

Henry J. Kaiser Co.

Chester R. Austin joins staff of Kaiser Engineers division to head oxygen steel division. He was formerly manager of development section, research department, of Koppers Co., Inc., in Pittsburgh, Pa., and earlier, with Battelle Memorial Institute in Columbus, Ohio, for 14 years. Kaiser holds U. S. license for steelmaking process developed by Brassert Oxygen Technik A. G.

Calaveras Cement Co.

Emmett J. Norris, Jr., assistant treasurer of company, is also named to post of credit manager. *B. B. Woodward, Jr.*, becomes acting purchasing agent in San Francisco. *Marshall Dragomanovitch* fills post of assistant purchasing agent for San Andreas plant.

Brea Chemicals

J. W. Miller is elected vice president of this subsidiary of Union Oil Co. of California. He has been manager of Union's marketing activities in Southwest.

Coast Pro-Seal and Mfg. Co.

Ben F. Warmer, formerly director of sales, is appointed vice president and general manager of this Los Angeles manufacturer.

COLORADO

Colorado Fuel and Iron Corp.

Gladwyn Sloan is appointed superintendent of roll shops at Pueblo plant. He has been with company since 1926. *Leslie H. Brown*, former superintendent, becomes head roll designer. His service in roll shops started in 1908.

Atomic Energy Commission

David D. Baker is appointed deputy director of mining division at Grand Junction Operations Office, succeeding *John J. Curzon*, who resigned to enter private industry. Mr. Baker joined AEC in 1954 as staff engineer in exploration division.

IDAHO

Day Mines, Inc.

Wray Farmin, Spokane, is elected vice president of this Wallace organization, succeeding *Frank M. Rothrock*, resigned.

NEVADA

Combined Metals Reduction Co.

Max J. Kennard is named vice president in charge of operations of this mining firm. *James F. Orr* succeeds him as general manager of Pioche Manganese operation. *S. E. Craig* is in charge of Utah operation, and *Paul Gemmill* in Nevada.

THE WIRE TO END WIRE WORRIES

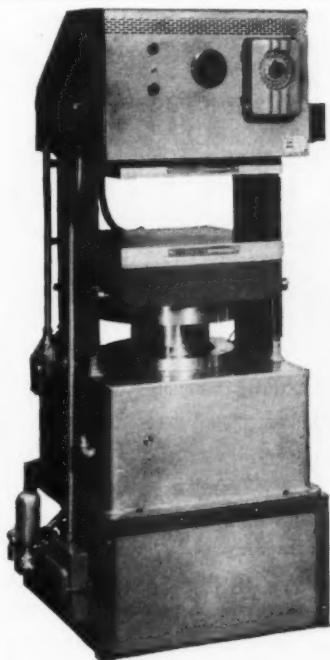


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WESTERNERS AT WORK

NEW MEXICO

U. S. Potash Co.

Franklin E. Johnson is promoted to post of mine mechanical supervisor of this Carlsonbad potash concern. He has been mine shift foreman since 1947.

Southwest Potash Corp.

Fred Stewart, general manager of company's mining and refining operations in New Mexico, is named a vice president. He joined parent company, American Metal Co., Ltd., in 1941 as geologist.

OREGON

Cottage Grove Gas Co.

S. Paul Radtke is president of this Cottage Grove firm, which was reorganized in 1954. Vice president is Sterling Macready and secretary-treasurer Myra K. Macready.

Portco Corp.

Frederick W. Dasch is elected secretary-treasurer of this Portland company. Thomas H. Glover becomes vice president in charge of lumber division.

Columbia Empire Industries Inc.

Thomas C. Donaca joins this Portland organization as assistant to manager.

UTAH

Kennecott Copper Corp.

Appointments made by Utah Copper division of this company are: general superintendent of operations, J. C. Landenberger, Jr., former superintendent of mines; superintendent of mines, V. S. Barlow; assistant mine superintendents, Ernest K. Simkins and Joseph A. Norden, Jr.; director of labor relations, Duane O. Olsen.

U. S. Smelting, Refining and Mining Co.

B. E. Grant resigns post of director of labor relations for this company's Western operations to establish mine management, engineering service, and geological consultant business in Salt Lake City.

American Metal, Ltd.

Dooley P. Wheeler, Jr., superintendent of company's western exploration division resigns to enter business as private consultant on mining geology with offices in Salt Lake City.

Union Pacific Railroad Co.

Robert M. Brown, Salt Lake City division engineer, is named to fill newly created post of district engineer, and is succeeded in former post by Myron W. Gustin, who has been office engineer in Idaho division at Pocatello. Melvin E. Byrne, former general roadmaster at Salt Lake City, is named to newly established position of engineer of track for two districts, with office at Salt Lake City.

American Smelting and Refining Co.

W. G. Rouillard, former manager of Garfield plant now on temporary assignment in New York office, is named manager of this company's Tacoma, Wash., plant, to replace Earl R. Marble, retiring manager. He is succeeded at Salt Lake by Kuno Doerr, Jr., manager of East Helena plant. Joseph T. Roy, superintendent at East Helena, takes over Mr. Doerr's former post. Stanley M. Lane, assistant superintendent, succeeds Mr. Roy.

WASHINGTON

General Electric

Robert J. Candy becomes manager of purchasing and stores section at Hanford atomic energy plant, succeeding Lewis F. Huck, who is leaving company.

Hershey Packing Co.

Harold Ilman, former production manager for this Seattle packing concern, becomes vice president and director.

Star Machinery Co.



I. B. Rabel V. E. Rabel
Star Machinery Co.

Irvine B. Rabel, former executive vice president, is elected president of this Seattle company, succeeding Victor E. Rabel, who moves to position of board chairman.

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TRADE WINDS

Ducommun opens new warehouse

Joseph W. Rabb, veteran of 18 years service with company, is named manager of Ducommun Metals and Supply Co.'s new Northern California division, assisted by Harry Gabriele, who has been San Francisco district manager for 34 years, and by Don B. Rollins. Ducommun is opening new 110,000-sq. ft. warehouse facility in Berkeley recently acquired from Arco Drainage Co.

New product for FMC

Canning Machinery Division of Food Machinery and Chemical Corp. is named exclusive sales agent for Articold package freezer, new contact-type freezer employing quick-freeze methods at minus 35 deg. refrigerant.

Pacific Coast appointments

Johns-Manville Sales Corp. expands Pacific Coast sales staff by naming Arthur W. Knight as merchandise manager for J-M industrial products division, Lawrence M. Osborn as staff manager, and H. C. Bruner as staff engineer, all with headquarters in San Francisco. Johan H. Peterson continues as Pacific Coast staff manager for Transite pipe products.

San Francisco firm moves

Campbell & George Co. moves to expanded quarters at 1601 Cortland Ave., San Francisco. Company is Northern California representative for Allen-Bradley Co., Automatic Control Co., Eagle Signal Corp., Roler-Smith Corp., and others.

Insul-Mastic dealer

Runnels Paint Co., Seattle, is now handling Insul-Mastic protective coatings manufactured by Insul-Mastic Corp. of America, Pittsburgh, Pa., and will contract for industrial and marine corrosion prevention and vapor sealing applications.

Heads San Francisco branch

Crucible Steel Co. of America, Pittsburgh, Pa., appoints Robert M. Simpson manager of its San Francisco sales branch. He has been assistant manager of this branch and succeeds the late H. G. Bain.

District manager Goodwin

John H. Goodwin, assistant district manager in San Francisco for Johns-Manville Industrial Products Division, moves up to position of manager, succeeding Ervin H. Clausen, retired. Mr. Goodwin's entire service with company, beginning in 1945, has been in the San Francisco office.

Denver man for Forker

Urban M. Lodge becomes Denver representative of Forker Corp., Cleveland, manufacturer of Ohio tramrail systems. He has been in field of materials handling equipment sales and engineering since 1949.

Haskel adds Parker valves

Haskel Engineering Supply Co., Los Angeles, is named exclusive distributor in California for hydraulic equipment manufactured by Parker Appliance Co., Cleveland.

Western Gear's marketing manager

Raimon L. Conlisk is promoted to marketing manager of industrial products for the six Western Gear plants (Lynwood, Pasadena, Belmont, and San Francisco, Calif., Seattle, Wash., and Houston, Tex.). He has been with company for about 10 years and was formerly supervisor of industrial application engineering in Southern California. James Sullivan succeeds him in that post.



R. L. Conlisk
Western Gear



C. D. Allis
McCulloch Motors
Corp.

Supervising all McCulloch sales

Charles D. Allis becomes general sales manager for McCulloch Motors Corp., Los Angeles manufacturer of chain saws, lawn mowers, and engine products. He moves up from post of assistant general sales manager.

Growing

Reliance Electric and Engineering Co. moves its San Mateo office, serving central and northern California, to larger quarters at 128 North B St., and adds a new sales engineer, Jack B. Critchlow, to sales staff.

High men at Hyster



J. R. Leep
Hyster Co.



H. A. Raasch
Hyster Co.

New service manager for Western division of Hyster Co. is James R. Leep, who succeeds Allen G. Owen, now in new post of service manager at San Francisco. Mr. Leep has served company for eight years, most recently as Western division parts manager, to which he now adds new duties as service manager.

Harvey A. Raasch is appointed export sales manager for Hyster. He was previously assistant export manager of Le Roi Co., Milwaukee, Wis., and before that was with tractor export division of Allis-Chalmers. His headquarters will be in Peoria, Ill.

Baron adds new service

Baron Industries of Los Angeles is picked as representative in California and Arizona for Bede Products, Amherst, Ohio, manufacturer of industrial paint heating equipment. Baron has installed a new service and parts department to assist Bede customers.

Egan heads wire product sales

John W. Egan is named manager of wire product sales by Bethlehem Pacific Coast Steel Corp., with offices in Los Angeles and at company's headquarters in San Francisco. He has been with Bethlehem in Los Angeles since 1945, specializing in wire sales and services.

Speedways for Hamerslag

Hamerslag Equipment Co., San Francisco, is named exclusive distributor in Northern California for full line of materials handling equipment made by Speedways Conveyors Co., Inc., Buffalo, N. Y. Other Hamerslag lines are West Bend, Ballymore, Aerol, Magline, and Bassick equipment.

Miller and Stern add line

Miller and Stern Supply Co. of San Francisco is appointed Northern California distributor of Totrust and Totrust enamels, "protectoneered" maintenance paint manufactured by Wilbur and Williams Co. of Boston.

Sales Engineer Repar

Parker Appliance Co. of Cleveland, Ohio, promotes John Repar to post of sales engineer for rubber products division. With Parker since 1950, Mr. Repar has held posts of chief chemist and later divisional engineer in company's rubber plant at Los Angeles. He and Ted R. Carrell now cover the West Coast market for Parker synthetic rubber o-rings and have their offices at Pacific branch of rubber products division in Los Angeles.

Build in Bakersfield

Republic Supply Co. of California is building new warehouse and office facilities in Bakersfield, set for completion in early June. Plans by George Vernon Russell, Los Angeles architect, include air-conditioned offices and living quarters for staff members on "round-the-clock" service in oil-producing areas.

Detlectron expands service

Detlectron Corp. of North Hollywood adds sales and service representatives throughout the country for its computer-measurements division. Western appointments are: Allen L. Williams Co., Denver and Albuquerque; Testco, Seattle; Koessler Sales Co., Los Angeles and San Francisco; and, for export sales, Frazar and Hansen, Ltd., San Francisco.

Pick Perlmutt-Colman

Electro Development Co. of Van Nuys, Calif., appoints Perlmutt-Colman and Associates, Los Angeles, as its representatives for sales and service on sub-miniature components for electronic and electro mechanical markets in Southern California, Arizona, and Nevada.

Marshall joins Rinshed-Mason

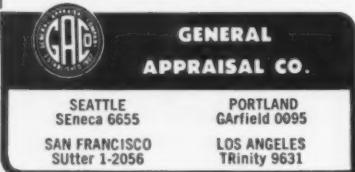
Ray L. Marshall is appointed industrial sales representative for Rinshed-Mason Co., Anaheim paint manufacturer. He leaves post of vice president in charge of sales for Pipe Line Coating and Engineering Co.

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**TRADE WINDS****New service for Shamban**

W. S. Shamban & Co., Culver City, adds distributorship for Teflon coated glass fabrics manufactured by E. I. du Pont de Nemours Co.

Teague transfers to Los Angeles

Winston E. Teague moves to Los Angeles district office of Chain Belt Co., where he will serve as sales engineer, the post he formerly held in San Francisco office. He has been with company, which produces chain and transmission products, since 1950.

New Lamson distributor

Thurlow-Moe, Inc., of Seattle is appointed sales agent for complete line of conveyors and automatic pallet loaders made by Lamson Corp. of Syracuse, N. Y. Territory includes states of Washington and Oregon.

Returns to Pacific Coast

D. L. Russell, Jr., is made sales manager for industrial products, Pacific Coast region, by Reynolds Metals Co., and will have headquarters in Los Angeles. He transfers from Reynolds office in Dallas, Tex., where he has been assigned since 1946. Before that he served as a field engineer in Los Angeles office and sales engineer in Seattle and Spokane. In his new post he succeeds W. O. Yates, who is now general manager of Pacific Coast sales region.

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Zepp covers the West

William H. Zepp, former mid-western district sales manager for Templeton, Kenly and Co., transfers to the West to head sales activity in states of California, Arizona, Nevada, Oregon, and Washington, with offices in San Francisco. Company manufactures Simplex mechanical and hydraulic jacks and pullers, with main office and plant in Broadview, Ill.



W. H. Zepp
Templeton, Kenly
and Co.

E. V. Chevalier, Jr.
Gerrard Steel
Strapping Div.

To manage Seattle branch

Edward V. Chevalier, Jr., is the new manager of Seattle branch of Gerrard Steel Strapping division, United States Steel Corp. He has been with Gerrard in Seattle since 1937 in post of salesman, and now succeeds Edward W. Williams, retired.

Michael to succeed Willson

William T. Michael is appointed Arizona apparatus manager for Westinghouse Electric Corp., with headquarters in Phoenix. He succeeds Walter G. Willson, who has been in the post for 24 years. Mr. Michael joined Westinghouse in 1941 and was assigned to the Phoenix office in 1948.

Union Oil reassessments

F. K. Cadwell, manager of Union Oil Co.'s central territory, with offices in San Francisco, moves to Los Angeles as manager of southwest territory. He replaces J. W. Miller, now executive vice president of Brea Chemicals, a subsidiary, and in turn is succeeded by Robert H. Rath, who was formerly manager of retail sales in northwest territory at Seattle.

Reports from Fibreboard

Two new assistant general sales managers are appointed by Fibreboard Products Inc., San Francisco: Hugh W. Hicks, formerly with Marathon Corp., and M. R. Baruh, formerly manager of sales promotion for Fibreboard. Frank H. Helmholz is transferred from company's Sacramento sales office to newly opened office in Billings, Mont.

Launch new company

Robert S. Hughes, former director of sales for Reliance Steel Co., organizes Hughes Co., with offices at 1525 Winchester Ave., Glendale, Calif., to serve as manufacturers' representative. Firm is already serving as local representative for Teflon products manufactured by John L. Dore Co. of Houston, Tex.

New quarters for Neely

New office and warehouse building is under construction in North Hollywood for Neely Enterprises, dealers in electronic equipment. Land and improvements, including 12,600-sq. ft. building shown in architect's sketch, will cost \$250,000.

New ties for Hunter

A. R. Hunter joins International Rectifier Corp., El Segundo, Calif., as sales and application engineer for company's selenium and germanium semi-conductor devices. He was employed by Wagner Electric Corp. for past seven years as sales engineer for electric motors and transformers.

Bullard promotes Seastrom

Norris E. Seastrom, former sales engineer, is named assistant sales manager for E. D. Bullard Co., San Francisco, manufacturer of industrial safety equipment. He joined company in 1952 and has a total of eight years experience in this field.

General Petroleum appointments

C. H. Wartman is named manager of newly-established marketing development department of General Petroleum Corp., Los Angeles. New general sales manager is Baxter F. Ball. Both operations are under direction of J. C. Sample, vice president and director of marketing, who succeeds Vern A. Bellman. Mr. Bellman moves to New York, as domestic sales manager of Socony-Vacuum Oil Co., Inc., affiliated company.

Zeni becomes sales manager

Henry C. Zeni is appointed sales manager of Arizona Chemical Co., which is jointly owned by American Cyanamid Co. and International Paper Co. His promotion follows a 30-year sales career in chemical industry and nine years with Arizona Chemical.

Los Angeles office

New offices of Chemical Division, Good-year Tire and Rubber Co., are established in company's Los Angeles district headquarters and warehouse. Robert G. Luskin is special representative in charge.

Named by Westinghouse

Louis G. Berger is appointed Western regional manager of apparatus and supply divisions of Westinghouse Electric Supply Co., with offices in Los Angeles. Martin B. Sauer is appointed consumer products regional manager, succeeding Mr. Berger, and J. R. Achilles succeeds Mr. Sauer as regional sales manager for consumer products. Both have offices in San Francisco.

ASSOCIATIONS ELECT

Portland Wool Trade Assoc.:

President, *Earl Rogness*, Columbia Wool Scouring Mills and Pendleton Woolen Mills; vice president, *Jack Gibson*, Burke and Catlin; secretary-treasurer (re-elected), *Ed Adams*, Pacific Wool Growers.

California Redwood Assoc.:

President, *Russell Ells*, president, Willits Redwood Products Co.; vice president, *Kenneth Smith*, vice president, Pacific Lumber Co.

Northwest Canners Assoc.:

President, *Leon C. Jones*, J. R. Simplot Co.; first vice president, *Norman W. Merrill*, Blue Lake Packers Inc.; second vice president, *Larry Jones*, Washington Canners.

Northwest Frozen Foods Assoc.:

President, *W. P. McCaffray*, National Fruit Canning Co.; vice president, *Adolph Hrabla*, Alderman Farms.

Southern California Water Heater Manufacturers Assoc. (new organization):

President, *W. J. Bailey, Jr.*, Affiliated Gas Equipment, Inc.; vice president, *C. R. Lombardo*, Hoyt Heater Co.; secretary-treasurer, *Frank R. Osborne*, Mission Appliance Corp.; executive director, *Claude Ballinger*.

New Mexico Manufacturers Assoc.:

President, *Joseph J. O'Connell*, president of Machine Engineering Corp., Albuquerque.

American Society for Metals (Golden Gate Chapter):

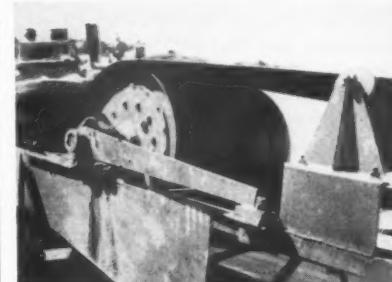
Chairman, *Victor M. Walberg*, Viking Forge & Steel Co.; vice chairman, *William C. Matheson*, Wm. C. Matheson Co.; secretary, *Harold E. Krayenbuhl*, Dorr-Oliver Inc.; treasurer, *Ernest W. Milburn*, General Electric Co., X-ray division.

Cooling Tower Institute:

Secretary, *Clayton E. Pickup*, The Fluor Corp.; treasurer, *Sidney Levine*, Santa Fe Tank & Tower Co.



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LABOR POLICY

Kennecott puts intentions down on paper

KENNECOTT Copper Corp.'s recently announced labor policy, which has been commented on editorially by **WESTERN INDUSTRY**, was released simultaneously by its four properties in Nevada, Utah, Arizona, and New Mexico after being first presented to representatives of the six unions with which the company bargains.

The seven main points of the labor policy are:

1. The company recognizes that the employer-employee relationship is a constantly changing one, and in accordance with that recognition, it will keep such relationship under constant review to assure that the company's attitudes are realistic.

2. The company recognizes the important part that labor organizations perform in the relationship between the company and its employees and acknowledges them as spokesmen for employees in many matters concerning company-employee relationships.

3. With labor organizations such an important factor in company-employee relationships, it is essential that such organizations be democratically organized and administered and be responsible for their actions. Management will encourage employee

members of labor organizations to take an active part in union affairs to insure democracy and responsibility.

4. The company recognizes its responsibility to make known to employees and labor organizations facts, policies, and plans which affect them and in which they have an interest. To accomplish this, communication between the company and its employees and between the company and representative labor organizations should be developed to the fullest practicable extent on a two-way basis. Management representatives will do their utmost to initiate such communications.

Employee relations

5. The company also recognizes the importance of its direct relationship with each and all of its individual employees. It recognizes this relationship is based on supervisor-employee respect, understanding, and cooperative effort. A major responsibility of supervision is the proper development of company-employee relationships. To be effective in this development supervision must be informed of and be in sympathy with company policies and plans.

In addition to direct supervision, all levels of management must promote harmonious relations with employees based on mutual respect, confidence, and understanding.

6. The company believes in the en-

couragement and development of employees in regard to their individual abilities in the interest of both the employees themselves and the company. The company recognizes the value of the work experience among its employees and management will urge and encourage employees to assist the company by making suggestions for improvements in its methods and operations.

7. The necessity for team work on the part of all employees is recognized by the company. With this in mind, management will at all times emphasize to each employee the importance of his participation as a member of the team.

FAIR POSTPONED

THE World Plastics Fair and Trade Exposition scheduled to be held in Los Angeles April 6-10 has been postponed to October 5-9. The affair will be held in the National Guard Armory.

25-YEAR CLUB

THE Quarter Century Metals Club has been organized by pioneer Los Angeles and Orange County metal-working executives. O. Hammer of Security Engineering Div., Dresser Operations, Whittier, is secretary.

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THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS,

DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

Canned foods grow with the West

The nation's population growth, plus wider acceptance of canned goods than had previously been considered possible, has brought the total Pacific Coast pack up from about 74,000,000 cases in 1945 to nearly 110,000,000 cases in 1953. The 1954 pack was off about 6% from 1953, due partly to a short cling peach crop, and canners are going into the 1955 season with low inventories and good financial position.

Consistent advertising of cling peaches for a period of years has helped move the increased packs of this item, but at the same time free-stone peaches have taken a big spurt, advancing from 500,000 cases in 1945 to more than 3,000,000 cases in 1953. Blue Lake bean canners in the Pacific Northwest have carried on promotion campaigns for several years, and in 1954 there was a record pack of around 6,000,000 cases, relegating peas to second place in the Pacific Northwest for the first time. Purple plum producers also are now embarking on a promotion campaign. Fruit concentrates were packed in 1954 for the first time in commercial quantities.

New lettuce crate of veneer and paper

An entirely new container—new as to material and construction—has been introduced experimentally for lettuce shipments. This is a container made with a rotary cut core (veneer), to each face of which is laminated a sheet of kraft paper. The side, top, and bottom are made of one piece with ends separate, and reinforced with wooden posts and rails. The result is increased strength with lightness and resistance to stacking pressure and moisture. The application of such a container may be broad in the produce field.

Sardines return to California waters

Sardines, which virtually disappeared from California waters in 1953, have reappeared in commercially significant quantities and probably some 60-70,000 tons were taken in 1954 as opposed to 3,000 tons in 1952 and even less in 1953. This compares, of course, with what was formally regarded as normal production of around 400,000 tons.

Because of the disappearance of the California sardine, markets have been lost and 1954 production should be adequate as a starter for the rebuilding of consumer demand for this product.

Gas appliances enjoy a top year

Gas appliance manufacturers on the Pacific Coast last year enjoyed a level of business comparable to the best year in their history, 1950. Water heater production, particularly, was good. The continued housing boom has helped appliance manufacturers to maintain production at a high rate.

Last year was a better appliance year than 1953 by about 9%. The largest trend in appliances seems to be the reduced demand for floor heaters, which are apparently being replaced by wall heaters, especially in tract housing.

Largest number of gas appliances manufactured in California are for markets in the Middle West, South, and East. Pacific Coast Gas Association reports the following Pacific Coast figures for 1954 gas appliance manufacturers:

Appliances	No. of Units 1953 (actual)	(in thousands) 1954 (est.)
Water heaters	774	780
Floor furnaces	49	25
Recessed vented wall heaters	273	280
Central furnaces	80	100
Vented circulating heaters	24	30

Portland cement business looking up

Portland cement business experienced slow going for the first six months of 1954 as a result of the change of administration which affected federal projects in general and Central Valley Project in particular.

Some shipments of cement were made by Northern California mills to the Southern California market where shortages existed during part of 1954.

The most important factor in the industry's optimism is the President's proposal to spend \$5,000,000,000 yearly for the next ten years for the construction of highways. In California, where practically all main highways are of concrete, the state's share of this program would mean a tremendous increase in cement requirements. While this proposal may not be accepted in toto, there is a distinct probability that a large portion of it will be, with corresponding benefits to the Western cement industry.

Another factor is the upsurge of residential, commercial, and governmental construction throughout the West. Irrigation projects planned for completion during the next ten years will use millions of barrels of cement; stores, factories, and schools for the West's expanding population will use additional millions of barrels; and the West's share of the probable more than a million homes to be built in 1955 will require a respectable barreleage of cement.

Specific building projects started in the West in 1954 indicate the scope and increasing use of new types of concrete construction for 1955. Concrete shell construction is being used for the roof over the Green Lake swimming pool in Seattle, Wash.; Richardson Bay bridge, near San Francisco, is utilizing 80-ft. long pre-cast and prestressed girders in its construction; and schools in Colorado, Montana, and Wyoming are using prestressed concrete roof systems in their new building programs.

ALASKA

INCORPORATE—Alaska Natural Gas and Petroleum Co., Inc., is organized at Anchorage, with capitalization of \$100,000. Anchorage Abrasives, Inc., of Palmer is incorporated for \$100,000 for mining and manufacture of abrasives and pumice products.

ARIZONA

COCONINO EXPANDS—Capacity of Coconino Pulp and Paper Co. at Flagstaff will increase about 60%, to a total output of about 40 tons daily, by April 1, when new machinery installations now under way are completed.

PUBLIC INVITED—Wright Manufacturing Co., Phoenix, holds open house for sheet metal shop operators and general public. Company, established in 1953, manufactures evaporative coolers, employing 300 persons.

URANIUM MILL—Rare Metals Corp., a subsidiary of El Paso Natural Gas Co., El Paso, Tex., files application with Atomic Energy Commission to build uranium mill at Cameron, and plans mining operation on properties near Cameron acquired in recent purchase of Arrowhead Uranium Co.

CLOSE COPPER MINE—Kennebunk Copper Corp. closes underground copper mine at Ray. Open pit production, which began in 1951, will be expanded by company's Ray Mines division to make up for underground mine.



"PLANT AMERICA" AWARD—Le Roi Rix Manufacturing Co. of Los Angeles wins national award for excellence of design in industrial landscaping and beautification, shared with Armstrong Nurseries of Ontario, Calif., who designed the planting. Awards are made annually by American Assoc. of Nurserymen.

CALIFORNIA

ELECTRODATA BUILDS—Construction begins on new 40,000-sq. ft. plant in Hastings Ranch section of Pasadena for ElectroData Corp., affiliate of Consolidated Engineering Corp. Plans call for completion of \$750,000 project in August 1955.



KAISER BUYS UNION STEEL—Union Steel Co., steel fabricating and erection concern in east Los Angeles employing about 300 persons, is acquired by Kaiser Steel Corp., Oakland. Plant, retaining a majority of present organization, will be operated as Fabricating Division of Kaiser Steel.

CANNON BOOMING—Cannon Electric Co., Los Angeles, will build new 30,000-sq. ft. building across from main plant to house offices, design and production engineering department, test laboratories, and model shop. Company, in another expansion, has taken over former plant of Stran Steel Corp., subsidiary of Great Lakes Steel, for enlarged Canseal group.

MOVE LOS ANGELES PLANT—Fluorescent Fixtures of California moves to new plant at 239 W. 31st St. in Los Angeles which provides increased space for assembly and storage operations. Company recently completed new fabrication plant in San Francisco.

INSTRUMENT FIRMS MERGE—Specialized Laboratory Apparatus Co. of Berkeley is merged into Hallikainen Instruments, also in Berkeley, and will be operated as SLACO Division. Hallikainen manufactures industrial instruments specially adapted for continuous processes.

TWO AT A TIME—Norris-Thermador Corp. purchases assets of Pearman Supply Co. and Cook Manufacturing Co. at Walnut, Calif., for about \$1,000,000. The two manufacturing plants on 24-acre site, one producing vitreous china plumbing fixtures and the other formed sheet aluminum aircraft parts, will continue in operation as division of Norris-Thermador. Former plant will be enlarged by addition of new kiln.

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118

RECORD BREAKER—Enterprise Engine and Machinery Co., subsidiary of General Metals Corp., begins production at its San Francisco plant of 16-cylinder, 6,150-hp. engine, said to be the largest diesel engine ever produced on the West Coast. Typical applications are for ocean-going cargo vessels, municipal power stations, dredges, and pipeline operations.

HONEYWELL TO BUILD—Minneapolis-Honeywell Regulator Co. plans to begin construction of new plant, engineering, and office building in Gardena within next month. The 105,000-sq. ft. structure will be located on 16-acre site south of present plant, which was completed in 1953. Addition of new plant will reportedly more than double output of gas appliance controls at company's Gardena operation.

CONTRACTS FOR RYAN—Ryan Aeronautical Co. receives second major subcontract for Air Force new Boeing KC-135 jet tanker-transport and another multi-million dollar subcontract for North American F-86 Sabrejet fighter-bomber.

NEW BENDIX FACILITY—Utica Division of Bendix Aviation Corp. opens \$100,000 servicing, engineering, and sales headquarters in North Hollywood.

DOUBLING SPACE—Pioneer Aluminum Supply Co. of Los Angeles, organized last year as distributor of aluminum aircraft extrusions, is doubling warehouse capacity with new 30,000-sq. ft. warehouse added to main building and will carry full line of mill products manufactured by Reynolds Aluminum Co.

MANUFACTURE STUDS—Nelson Stud Welding Division of Gregory Industries, Inc., resumes limited stud manufacturing operations at its factory branch warehouse in San Leandro.

CONSTRUCTION BUDGET—Standard Oil Co. of Calif. allocates \$100,000,000 of its \$300,000,000 budget for 1955 to construction of refinery additions and new marketing facilities.

S. P. PIPE LINES—Southern Pacific Co. plans to construct pipelines from Los Angeles and El Paso refinery areas to Phoenix and Tucson, following railroad right-of-way where it is economical to do so. Total investment in line, stations, and terminal facilities is estimated at \$30,000,000. New company will be formed, which will probably have the name Southern Pacific Pipe Lines, Inc.

NEW ENTRY—Hoffman Electronics Corp. of Los Angeles acquires outstanding stock of The Analyzer Corp., manufacturer of analog computers. Inventory, tooling, and equipment has been moved to Hoffman's main plant, which will begin production of a redesigned Nordsieck computer within six months.

BUILD NEW FOUNDRY—Martin-Ruegg Co. is building \$100,000 foundry adjoining its new brass and aluminum die casting plant in Gardena, and plans to move foundry operations from their present location to new building sometime in spring.

INVESTMENT CASTING—Humphrey, Inc., of San Diego forms new investment castings division, which will supply castings for production of gyros, potentiometers, and accelerometers developed by company, as well as serving aircraft and other industries in area. Castings Division will occupy 2,100-sq. ft. facility recently acquired by company for expanded production.

OPEN GARDENA PLANT—Rack Engineering Co. of California opens new fabricating and assembly plant in Gardena. Company, which manufactures materials handling equipment, is West Coast affiliate of Rack Engineering Co., Connellsville, Pa.

ON STREAM—Tide Water Associated Oil Co. puts 420,000-gal.-per-day hydrocarbon platformer into operation at its Avon Flying A refinery. Platformer produces high-octane gasoline component, with hydrogen sulfide by-product which will be used in making sulfuric acid at nearby plant, owned jointly by Tide Water and Monsanto Chemical Co.



LONG BEACH PLANT OPENS—New \$3,000,000 plant for Grayson Controls Division of Robertshaw-Fulton Controls Co. is opened at Long Beach. Designed by Quinton Engineers, Ltd., and built by Lindgren and Swinerton, Inc., plant has 237,000 sq. ft. of floor space in two factory buildings and an office building. Division anticipates doubling production of its thermostatic controls and ignition devices, expanding product line, and adding about 900 employees in coming months.

JOIN MASONITE—Pacific Board Fabricators of Los Angeles is acquired by Masonite Corp., Chicago. New division will continue to fabricate and process Preswood and other hardboards, employing expanded facilities in Los Angeles as well as a unit of Masonite plant in Ukiah.

SUBSIDIARY FOR PLOMB—Plomb Tool Co., Los Angeles, acquires all assets of Industrial Tools Manufacturing Co. of that city for a reported \$65,000, to be operated as a subsidiary which will specialize in small orders of special tools. This is Plomb's sixth plant acquisition.

MORE SPACE—California Metal Enameling Co., Los Angeles, buys acre and a half of land across from its plant.

NEW NAME—Townsend Co. of New Brighton, Pa., changes name of subsidiary acquired last year from West Coast Tool and Supply Co. to Armament Components, Inc. Subsidiary, which now is located at Townsend's Cherry Rivet Division in Santa Ana, designs and manufactures items for use in automatic weapons system for military aircraft and armored vehicles.

DU PONT PICKS ANTIOCH—Construction will begin this summer at site two miles east of Antioch on plant for manufacture of tetraethyl lead and Freon refrigerants for E. I. du Pont de Nemours & Co.

LATEX PLANT—American Latex Products Corp. is adding \$500,000, 80,000-sq. ft. extension of its Hawthorne plant for expanded production of foam rubber and polyurethane plastic. Project will be completed by August, at which time employment will be increased from present 350 to about 500.

PLAN MOVE FROM CITY—H. J. Heinz Co. will enlarge its Tracy plant with addition of warehouse, office building, manufacturing building, and additions to present plant, and plans a gradual transfer over next two years of both its Berkeley plant and Western regional offices to Tracy.

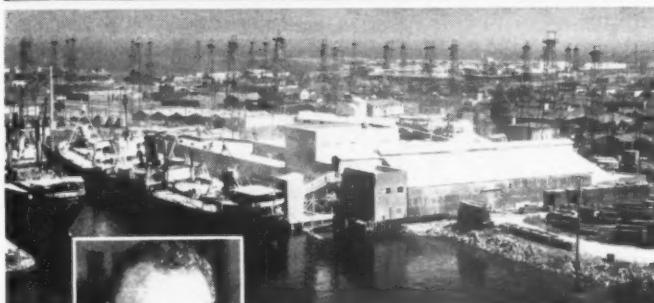
COLORADO

AMERICAN CAN—New 60,000-sq. ft. plant of American Can Co. in Denver begins operations. Rated capacity is over 125,000,000 cans annually, made up of steel containers for beer and food products.

CANADA VENTURE—Stearns-Roger Manufacturing Co., Denver, sets up Canadian subsidiary, Stearns-Roger Engineering Co. Ltd., with headquarters at Calgary, Alberta. New organization will offer services of parent company, such as process engineering, general engineering, fabrication, and field erection.

NOT HAY—After a year's delay, work is underway on a \$1,000,000 chlorophyll plant in Lamar by National Chlorophyll and Chemical Co., a subsidiary of National Alfalfa Milling and Dehydrating Co. Scheduled to open in March, plant will produce chlorophyll-D for dog food and protomone for dairy feed.

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PILOT WORK ON SHALE—Union Oil Co. of Calif. undertakes \$5,000,000 research program which may lead to commercial development of estimated 5 billion barrels of shale oil reserves in company's holdings at Rifle, Colo. Union will build pilot plant and retort at Rifle, near government experimental shale plant.

THORIUM REFINING—American Mineral Development Corp. will build thorium refining plant at Canon City.

OIL RESEARCH LAB—Ohio Oil Co. of Findlay, Ohio, will build \$1,000,000 petroleum research laboratory on 80-acre site near Littleton this spring. When completed in early 1956, laboratory will employ about 75 scientists and 25 office and maintenance people.

\$3,000,000 PLANT—Pure Oil Co., Chicago, in cooperation with eighteen well owners in Ardena field, begins construction of \$3,000,000 gasoline extraction plant near Fort Morgan. Plant, scheduled to open by July, will process natural gas at a design capacity of 12,000,000 cu. ft. daily.

MONTANA

MAY BUILD MILL—Western Montana Exploration and Development Co. plans exploratory drilling program about 10 mi. southeast of Hall for open pit mining and will build mill in early spring if support of Small Business Administration is secured and equity sale goes forward successfully. Mill would have 300 to 500 tons daily capacity.

NEVADA

MULTI-MILLING—New mining company, Multi-Milling Corp., is formed in Yerington, backed by George Tausan,

M. S. Peek, Roy G. Coverston, and Frank Dodge. Company plans to build 300-ton mill for custom ore at Silver Springs, and is at present making a survey of mines in Western Nevada to estimate production potential.

NEW MEXICO

BULK GASOLINE STORAGE—Texas Co. will build gasoline storage depot in Albuquerque. Standard Oil Co. of Texas begins operation of its bulk plant in that city, consisting of nine new storage tanks with a capacity of 80,000 bbl.

EXPANSION AT CARLSBAD—International Minerals and Chemical Corp. undertakes \$1,000,000 expansion at its Carlsbad plant, which will increase production of potassium sulphate by 40,000 tons per year. Stearns-Roger Manufacturing Co. is in charge of construction.

OREGON

BRANCHING OUT—Rosboro Lumber Co., Springfield, purchases Miller-Gardner Fabrication Co. of Monroe, relocates acquired machinery and equipment in newly built quarters at Rosboro, and integrates Miller-Gardner key personnel in its own organization, to create new manufacturing department for fabricated lumber products. New department, headed by Val Gardner, will produce trusses for roof construction, mine framing, prefabricated house components, and miscellaneous cut stock.

SEEK BUYER—Igleheart Bros., Inc., plans to sell its Pendleton flour mill and elevators. Company is under Associated Products division of General Foods Corp., which is concentrating its packaged cake flour production at other plants.



YERINGTON MINE—Anaconda Copper Mining Co. is recovering sulfuric acid from low-grade sulfur ore being mined in Yerington mine at Weed Heights, Nev., shown above. The plant can operate at 450 tons of sulfuric acid per 24 hours. It was erroneously reported in our January "Contributions of Western Engineers" that the sulfur is manufactured from copper ore and the plant capacity 250 tons of 100% sulfuric acid per 24 hours. Copper output of Yerington operation is 5,000,000 lb. per month, recovered from low-grade copper ore.

NEW GLASS PLANT—Owens-Illinois Glass Co., Toledo, will build two-furnace glass container plant on 70-acre site in Parkrose area of Portland. Scheduled for completion in mid-1956, plant will have four buildings, including main factory, warehouse, batch house, and compressor building, with anticipated employment of several hundred persons. Glass containers will supply fruit and vegetable packers of Northwest.

FRUEHAUF BRANCH—Fruehauf Trailer Co. acquires 5½-acre site in Portland for construction of \$250,000 facility to consolidate branch operations in this area, now being carried on in three separate locations. Company reportedly is also considering building new factory in Northwest but has not yet picked a site.

DOERNBECHER SALE—Doernbecher Manufacturing Co. of Portland sells its sawmill and veneer plant at Coalca for \$100,000 to J. D. Coleman, Alice Coleman, and Condon Lumber Co.

ADDING—Roseburg Lumber Co., Roseburg, will expand its Dillard fir plywood mill and add a green end operation for veneer at its Dixonville mill by late summer. Overall program calls for 60% increase of its present capacity, to a future total of about 122,000 sq. ft. per year, and adding another 200 workers to its present force of around 300.

JOINT VENTURE—Elk Lumber Co. and Medford Veneer and Plywood Corp. of Medford plan to set up new company, Oregon Veneer Co., which will build green veneer mill in Medford area, with annual output of about 12,000,000 sq. ft. of 1/12-in. veneer. Construction cost is estimated at about \$300,000.

NEW PLASTICS FIRM—Architectural Plastics Corp. is organized in Eugene with capital stock of \$100,000, to design, process, manufacture, and distribute plastic materials.

BPA SUBSTATION—New \$1,925,000 substation will be built by Bonneville Power Administration late this year or in spring of 1956 north of Orenco, serving Portland area. Substation is scheduled for operation in October 1956 and will be a distribution point for The Dalles Dam when it is put into service in 1957.

REYNOLDS REPORT—Reynolds Metals Co. will build aluminum fabricating plant in Pacific Northwest in 1955, states John Krey, assistant to company president, and will announce site within six months. Two possibilities are company's Troutdale, Ore., or Longview, Wash., tracts.

WASHINGTON

EMPLOYEE-OWNED—New venture, West Coast Door, Inc., owned by over 100 of its employees, reopens former Monarch Door and Manufacturing Co. plant in Tacoma, which closed last December.

HELICOPTERS—Monte-Copter, Inc., Seattle, offers stock to finance production of one-man helicopter, which is expected to sell for under \$5,000, for agricultural and communications use.

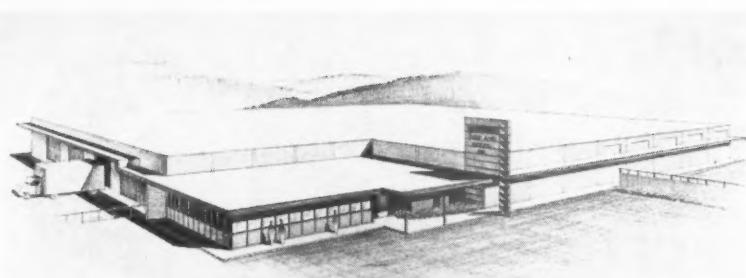
BUILD FURNITURE PLANT—Lynch Manufacturing Co. of Seattle acquires 21 acre site in Kent for construction of furniture factory, first step in announced long-range expansion program. First unit of plant will have about 30,000-sq. ft. floor space, and on completion of second phase of construction total manufacturing space will be 100,000 sq. ft. Initial investment will be \$150,000.

TIMBER PRODUCTS—New fabricating and laminating firm, Timber Products Co., is formed in Renton by Andy Toth, former division manager of Timber Structures in Seattle. Firm has already built fabricating plant in Renton and will soon put in operation a glue laminating plant. Combined production will be over 50,000 bd. ft. per day of wood roof trusses and laminated material.

TENTATIVE PLANS—Oregon business men may organize Woodlawn Plywood cooperative to take over inactive Woodlawn plywood plant in Hoquiam, provided agreement can be reached with creditors of defunct firm. Renovations and new equipment costing \$250,000 are planned. Capacity would be 5,000,-000 sq. ft. per month, employing 200 men.

CHEMICAL PLANT—Grin Chemical Corp. of Pasadena, Calif., will build \$500,000 chemical plant in Seattle.

BUY GAS COMPANY—Shelton Gas Co., Shelton, is acquired by Cascade Natural Gas Corp., Seattle.



SIMONDS SAW—Construction is underway for this new building for Northwest branch of Simonds Saw and Steel Co. in Portland. The 60,000-sq. ft. building will provide space for saw manufacturing and repair operations, warehouse, and sales and service facilities. Headquarters of company are Fitchburg, Mass.

GRAPE JUICE—Prosser Packers, Prosser, will begin construction this month of \$160,000 grape processing plant. Initial production will be 1,500 to 2,000 tons of grapes from 1955 vineyard produce, to rise in the following years to 7,500 tons.

THIRD MACHINE FOR SCOTT—Scott Paper Co. puts its third high-speed paper machine into operation at Everett and begins work on fourth, scheduled to begin production later this year.

COOS BAY EXPANSION—Coos Bay Pulp Corp., wholly-owned subsidiary of Scott Paper Co., plans construction of new wood preparation plant, adjacent

to existing mill at Anacortes, to process cordwood for use in manufacturing bleached sulphite pulp. Project includes installation of two mechanical barkers, 112-in. log chipper, auxiliary equipment, and storage tanks for pulp-treating chemicals.

WYOMING

URANIUM MILL—New company, Uranium Ore Reduction Co., is applying to Atomic Energy Commission for approval to build uranium mill at Riverton for reduction, smelting, and refining of uranium ore.

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FIG. 1611
Balance-type platform stake truck

FIG. 1452
Heavy duty bar handle platform truck

FIG. 1152 DPL
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FIG. 16
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FIG. 219
Golden Gate Pattern

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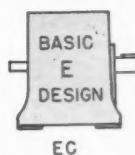
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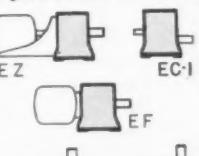
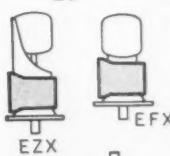
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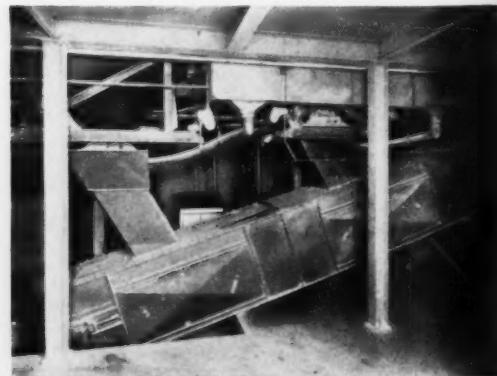
Here one man can operate the entire batching plant. Yet thousands of tons of sand, soda ash and lime are handled on a 24-hour, seven-day-a-week schedule. It's done automatically with push-buttons controlling various S-A conveyors, elevators and feeders that move the raw ma-

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Raw materials are delivered to the plant in either hopper bottom or box cars. A power shovel aids in unloading box cars into the track hopper. From there, materials are conveyed to a bucket elevator which lifts them 100-ft. to the top of a sectional silo. A distributing conveyor which pivots around the center of the silo can be positioned to discharge the various raw materials into the proper section of the silo. Signal lights at the control station below the silo indicate the position of the distributing conveyor. Silo compartments are discharged by vibrating feeders which feed an exact weight scale. Materials are then belt conveyed to a mixer which feeds further production processes.

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Ask to have an S-A engineer call—there's no cost or obligation.



▲ All belt conveyors handling raw materials are completely enclosed. This unit moves material from batch scales to mixer. Push-button control panel for conveying system is in background.

Storage silo with automatically loaded sections holds 2000 tons of raw materials. Box car is unloaded into track hopper by S-A power shovel. S-A car puller, lower left foreground, aids in spotting cars over hopper.

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